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Self-Acting Carder Feeder.

The woolen trade is every year increasing in importance and extent, and has already become the leading manufacturing interest of the country. Under the present highly protective tariff there is little doubt that the rate of increase will be greater than ever before, and even now, in the depressed condition of many other branches of trade, there are indications of vigor in this department, and new factories are springing up on every hand. It is, however, of the utmost importance that our manufacturers should keep pace with Europe in every improvement, and we present them with the accompanying engraving of Apperly's Patent Self-acting Carder Feeder, which has already gone into use in England, France and Germany. This is considered by the leading woolen manufacturers of Europe to be one of the greatest improvements of the age, and those American manufacturers who have fairly tested the machine, fully coincide with the opinion; in testimony of which we refer our readers to our advertising columns.

Wool is carded or prepared for spinning woolen yarn by passing through three carding machines, called technically the first braker, the second braker and the finisher. The wool is spread evenly by hand upon an endless apron, which forms a table in front of the first braker, and is thus carried into the first carding machine. Having passed through to the doffer of the machine, it comes off in the form of a thick cord or roll of wool, called the drawing or sliver, which is wound on a large spool, and as soon as one spool is filled it is replaced by another. A number of these spools are then put upon a spool stand, which is placed in front of the second braker, the end of the drawing from each spool is placed between the feed rolls, and the machine gradually unwinds and empties all these spools, to be at once replaced with other full ones. This same operation takes place between the second braker and finisher, and the whole of this has hitherto been done by hand.

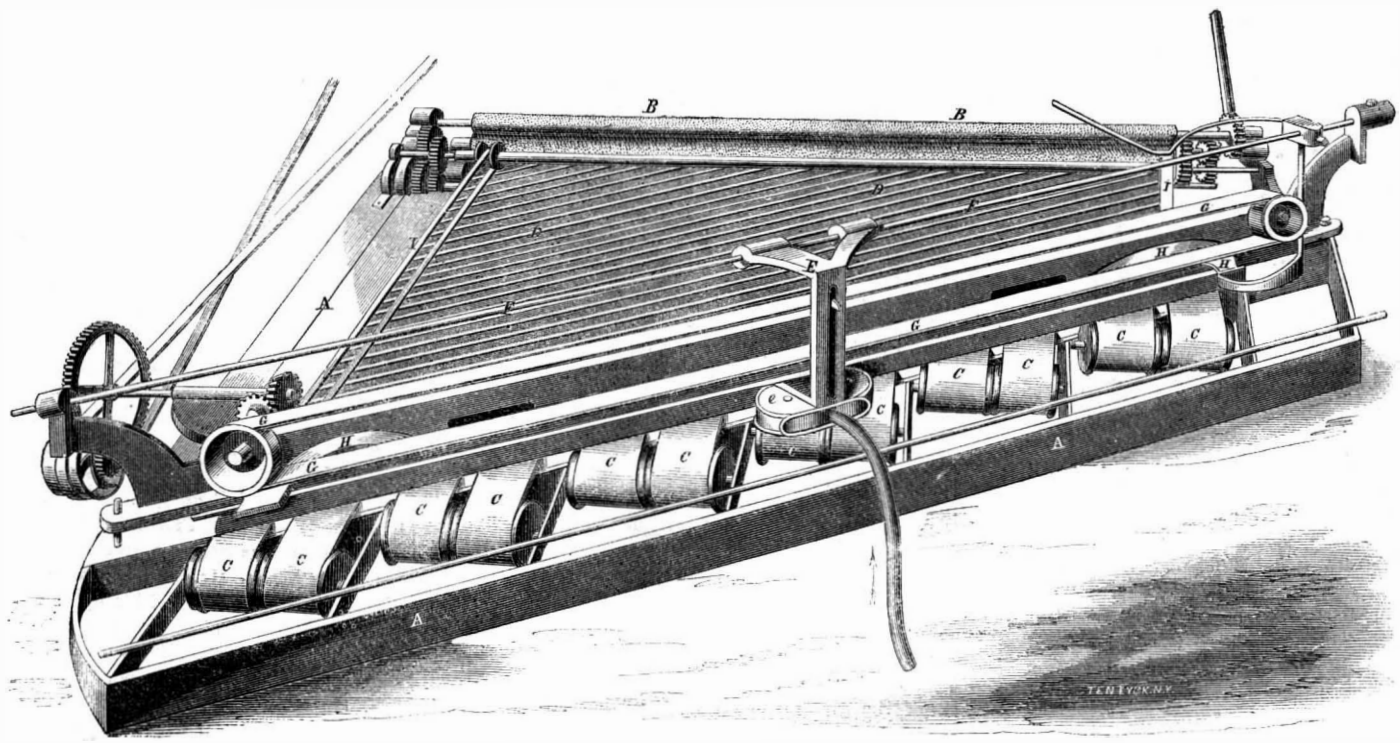
It is the object of this card feeder to do all this work between the second braker and finisher and between the first and second braker; and it is done much better than it could be done by hand. It has, by the old plan, taken six or eight hours to obtain roping from the finisher ready to spin, but by this feeder it is obtained in fifteen or twenty minutes.

The feeder is attached to the carding machines called the second brakers and the finishers, and its operation will be understood by an examination of the engravings.

A A is the frame of the carder feeder, which rests on the frame of the carding machine; B B are the feed rolls, corresponding with the ordinary feed rolls of the carding machine; C C are endless bands which form together an English apron, upon which the bed of sliver, D D, is placed by a traverser, E E, which takes the roping or sliver as delivered from the first or second braker machine, and, passing it between two rollers, *e e*, at the foot of the traverser, E E, travels with it back and forth upon the shaft, F F. The traverser, E, is carried by an endless belt, G G, and lays the sliver across the machine, delivering it at either end to a latch, H H, which holds the sliver properly extended until the apron carries it forward to the spiked straps, I I, which carry on the bed of sliver till it is passed to the feed rolls, and thence into the machine. The work is fed into the first braker as usual, by hand; it then passes without delay, untouched, through the cards until it is condensed into roping.

The principal advantages of using the machine are, a considerable saving of labor and waste, making the yarn more even than is possible by the old method, by the diagonal mode of feeding the staple of the wool is protected, and, finally, a considerable saving in card clothing, as all parts of the card work equally, the wool being spread evenly all over the card. The machine is exceedingly simple, and is not at all liable to get out of order.

This invention is the subject of a patent in England and the United States; Letters Patent having been granted to James Apperly and Wm. Clissold. It is also in operation at the World's Fair in London, both in the English and French departments.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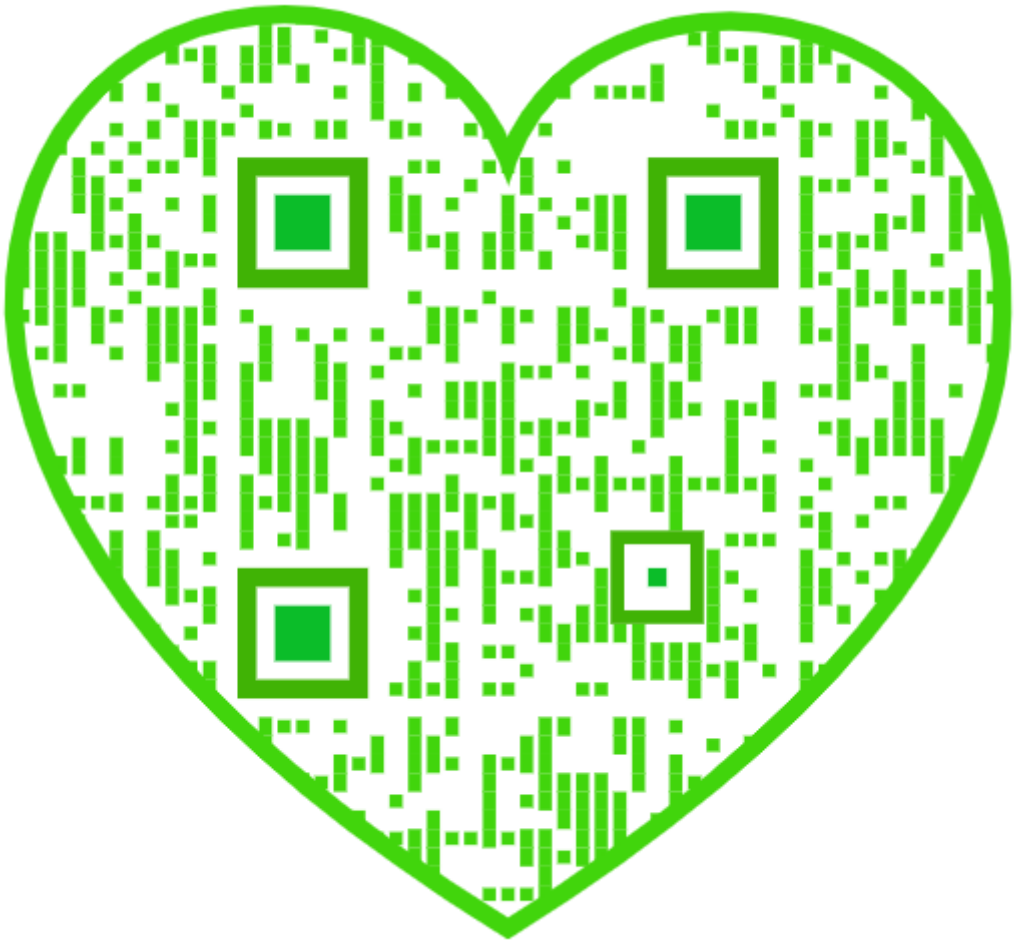

NOTES ON NAVAL AND MILITARY AFFAIRS.

The movements of the army and navy are, at this time, devoid of special interest. Delay and reorganization seem to be the order of the day, and just so soon as the military leaders announce that all is ready, no doubt forward movements will be vigorously made. It seems to us that the fate of this rebellion must be determined, to a great extent, within the next three months, though we confess that our want of knowledge of the plans of the Government does not enable us to speak understandingly on the subject. Looking at the position of things from our stand-point, we confess we feel pained and mortified at the present state of things. The army movements seem to us slow, and the navy seems to be doing little more than trying to blockade the Southern coast. We were told a few days ago, by an officer connected with the navy, that naval movements had not, in his judgment, been conducted with sufficient vigor.

We would like to know the value of the *Monitor*, the *Galena* and the *New Ironsides*, upon which Government has expended so much money—unless they are useful for something besides mere watchers on the blockade. Another thing pains us, namely, the delay in getting additional iron-clads ready for service. We now need a fleet of these vessels to coöperate with the army, but we fear that not more than one or two will be ready before January.

We hope our impressions on this subject may be groundless, and that before the lapse of many weeks we shall see and hear of the fall of Fort Sumter, the occupation of Savannah, Mobile and Galveston. The great heart of the nation throbs with anxious expectation. We trust that it may not be disappointed.

New Helps of Agriculture in Aid of War.

Under the above title the Cincinnati *Gazette* contains a well-written and most interesting article, from which we take the following extracts :—

While war brings its work of destruction, and every day's report is of blood and death, Providence has not left us without compensations, and in the exact line where aid is needed. In the city, where many manufacturers are thrown out of employment, and many men have left destitute families, we see around us some compensations which are valuable and timely. The wants of the army demand an immense supply of food, clothing, munitions, &c. In supplying these, especially in the clothing department, thousands of women, many men, and much capital, have found employment, and some of the departments of business are more active than they have ever been. In the country, however, it is not quite so obvious how the deficiencies caused by the war are to be supplied. But, a close inspection will show that the new helps to agriculture have really been equal to all the drafts made by the war upon its labor and resources. This is a most singular fact in the history of industry, but it is a fact, and is produced by the rapid progress of useful art and inventions within a few years. In the year 1861 full 60,000 men, able-bodied men, were taken from the State of Ohio, and enrolled among the permanent volunteers. In the year 1862 we send out 70,000. Exclusive of three months' men and civil employes about the army (which also make thousands), Ohio has sent 130,000 men into the three years' service, a most enormous draft on the labor of the State. More than three-fourths of these came from the agricultural population. Here, then, we have near 100,000 laborers taken from agriculture and its adjunct arts; yet we see that the harvests of 1862 have been great—probably as great as in any one year—and that a vast surplus will be sent from this State to supply the wants of Europe and the army. The value of the surplus products of the State will pay the interest on the national debt accumulated in two years of war. This is a result which no European statesman could have guessed at, and which to him must appear scarcely less remarkable than the performances of Aladdin's lamp. A State not sixty years old sending into the field an army of 130,000 men, and yet sending its surplus bread to feed the destitute populations of England and France, is an exhibition of industry and fertility which Europe has not seen, and no slave State of America has ever produced. But we admit that, just at the present time, it would hardly have been produced but for new arts of agriculture, and to these we would give a moment's glance.

A hundred thousand agricultural laborers are gone; how are we to meet the deficiency? We have met it chiefly by labor-saving machinery. A few year since, McCormick came to Cincinnati to manufacture his reapers. The idea then was, that they were suitable only for the large prairie wheat-fields. It was the only agricultural machine we had, and it was met, as usual, by doubt and hesitation. Soon after, this machine and others appeared at the World's Fair, and it was pronounced a great success. Since then we have reapers, mowers, separators, sowers, drills, &c., making a great aggregate of agricultural machinery, which does the work of more than three-fold the number of men, who (without machinery) would have been required to do it. Indeed, without this machinery, the wheat, oats, and hay of Ohio, in 1862, could not have been got in safely. Besides, this machinery, which was at first only intended for large farms, now operates on the smallest; and on the large tracts steam is successfully employed, multiplying ten-fold the labor-saving power. At Dayton, Springfield, Lancaster, Canton and Cleveland, large factories are engaged in turning out agricultural machines; so that we have the benefit both of the making and the use of agricultural machinery. The mode in which the harvest of 1862 has been principally got in, is this. One farmer in a neighborhood buys a machine, whether reaper or separator, and goes round doing the work of his neighbors at so many cents per bushel. It is thus that machinery has done the work of thousands of men, who have thus been spared for the war. Again we have introduced new products. Few persons know the extent to which sorghum has been cultivated. The reader who will pass up some of the roads of the interior, will find the sorghum mills constantly grinding the cane; and we believe Ohio will this year produce all the molasses she consumes. The sorghum sirup has also been greatly improved, and is now pronounced by many persons to be equal to the very best in market.

It is by means like these that Ohio has not felt the loss of tens of thousands of her men, and her farms and fields still present the smiling aspect of a productive and prosperous country. Notwithstanding the great losses and sacrifices of the war, Ohio presents to the eye of a stranger nothing but peace and tranquillity. Who shall say Providence has not been on her side? The markets of Europe demand her products. The world without pays for her labor, machinery supplies the loss of her men, health prevails throughout her borders. The war drum is heard, and the bugle sounds the battle cry; but the sounds pass far away, and no enemy invades or harms her territory. Providence has raised up compensations of the greatest and most valuable kind. Not the least of these are the new arts of agriculture, which enable towns to grow and war to be carried on, without materially diminishing the productions of agriculture.

Eleven Rebellions in the United States.

Since the organization of the Federal Government, eleven attempts have been made to resist its authority. The first was in 1782—a conspiracy of some of the officers of the Federal army to consolidate the thirteen States into one, and confer the supreme power upon Washington. The second, in 1787, called Shay's insurrection in Massachusetts. The third in 1894, called the Whisky insurrection of Pennsylvania. The fourth in 1814, by the Hartford Convention. The fifth in 1820, on the question of the admission of Missouri into the Union. The sixth was a collision between the Legislature of Georgia and the Federal Government, in regard to the lands given to the Creek Indians. The seventh was in 1830, with the Cherokees in Georgia. The eighth was the memorable nullifying ordinance of South Carolina, in 1832. The ninth was in 1842, in Rhode Island, between the Suffrage Association and the State authorities. The tenth was in 1856, on the part of the Mormons, who resisted the Federal authorities. The eleventh is the present attempt at secession.

American Cow-Milkers in England.—A correspondent of the London *Engineer* states that Colvin's cow-milker was exhibited at the Warwickshire Agricultural Show at Birmingham and a certificate awarded to it by the judges, and these milkers are being manufactured in large numbers at Smethwick. An engraving of this invention may be found on page 4, Vol. III, (new series) of the Scientific American.

A Confederate Scottish Steamer Sunk.

A very fast Scottish steamer, called the *Iona*, was lately purchased in Glasgow for the purpose of running the blockade and carrying stores to the Confederates, but as "the best-laid schemes of mice and men go oft aglee," so in this case, the *Iona* was fated never to reach a Confederate port. She had just started on her voyage to America, on the 2d of October, and was proceeding slowly out to sea at night, when she was struck amidships by the *Chanticleer*, a new steamer returning from a trial trip. In reading the account of the collision in the Glasgow *Herald*, we have come to the conclusion that the pilot intended she should have been sunk. The *Iona* went down stern first, in water 150 feet deep, and for a short period she stood perpendicularly erect like a great steeple 230 feet in hight, that being her extreme length. She had a very large cargo of military and other stores aboard, and of this only a kitten and a new shovel have been saved. The kitten was picked up from a piece of the wreck, and the new shovel was saved by a fellow who was found lustily swimming with it for the shore. He seemed determined, sink or swim, that he and his new shovel should not be parted.

MISCELLANEOUS SUMMARY.

Petroleum.—The Oil City *Register* states that the price of oil has advanced lately :—At a rough estimate we should think there were about 50,000 barrels of oil at this point awaiting shipment, of which 30,000 barrels are already loaded in bulk, in boats. There is boat-room for fully 100,000 barrels here, including that already loaded. Probably not less than 75,000 barrels will be shipped on the first resumption of navigation. A large proportion of this is destined for the Eastern market, or is already contracted for. There is great demand for teams. There is an improved demand in the Eastern markets for crude, which is quoted at 15@16½ cents. Refined at 30 to 37 cents, according to quality. There is an active demand for both crude and refined in the European markets.

An American Ship-Builder on Iron-Clads.—Donald McKay has sent a long communication to the Boston *Commercial Bulletin*, in which he gives a very full account of the French and British iron-clad frigates that have been constructed, and those which are being built. Mr. McKay comments upon our *Monitor*-class of vessels and his opinion is very unfavorable to them. Since he wrote, experiments have taken place which should modify his opinions with respect to the invulnerability of heavily-plated vessels. In our next issue we shall publish leading extracts from his letter with such comments as they necessarily call forth.

Highly important gun experiments have again been tried at Shoeburyness. The new Whitworth shell, weighing 131 pounds, has proved itself most destructive. At six hundred yards it passed clean through a formidable iron and wood target as if it were a punch, and afterward exploded with terrific force. The charge of powder was twenty-five pounds. Mr. Whitworth was warmly congratulated on his success.

Street railways are to be immediately introduced in the cities of Hamburg and Altona. Herr Muller, a civil engineer, has also devised a system of city railroads for Berlin and Vienna, and it is considered likely that the latter will accept the proposition.

A bit of phosphorus, from a match, ignited under the finger nail of a German student at Dusseldorf, and, though the flame was immediately extinguished, the hand swelled so rapidly that the whole arm had to be amputated.

The *Sycamore Sentinel* (Ill.) says : "Barley is our most profitable crop this season; it is even higher than wheat, having reached $1 per bushel in Chicago. It is always a good crop and can be raised cheaper per bushel than oats."

Winter is coming; let the sisters and mothers of the soldiers begin to knit two or three pairs of thick woolen socks, to be forwarded to each son and brother.

Mr. Story, the American sculptor, has sold his statutes of "Cleopatra" and "The African Sibyl" for 3,000 guineas.

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RULES FOR MAKING GOOD GRAPE WINE.

The following rules for the manufacture of wine was communicated to the *Vigneron*, a French journal expressly devoted to the wine-growing interest, by M. D. Babo, the president of an agricultural society, and an extensive proprietor and wine-grower at Weinheim, in the Grand Duchy of Baden :—

1. The grapes should not be gathered until they have arrived at complete maturity, that is to say, when they do not grow sweeter, in a sensible degree. If the weather is good, they may be allowed to hang some time after this for the purpose of giving the watery parts of the fruit time to evaporate. This increases considerably the strength and sweetness of the wine. Black grapes intended for red wine should not be allowed to become too ripe, as, if they do, they injure the color of the wine.

2. The vessels should be clean, and, above all, should not have contained sour wine. Care should also be taken that nothing should be allowed to fall into the must, which might cause acidity during the fermentation.

3. The white grapes should be put in a tub and pressed as quickly as possible, with the stems on. If obliged to wait before pressing the must, it is best to take out, at least, a portion of the stems which it contains, so that it shall not taste of them. The must of weak and mucilaginous wines ought to be allowed to ferment some days with the stems, so that the tannin which they contain will assist in the precipitation of the mucilaginous matter. For good wines, the mash or residuum of the grapes should never be pressed, as the last juice which comes from the press usually contains great deal of acid, and but little sugar.

4. For the sharp wines of inferior quality, and for sweet and mucilaginous wines, it is indispensable to put the must into open tubs, and to leave it there for several days. There forms during this time a layer or stratum of a dirty brown color, which contains a great part of the mucilage, yeast and acid rejected by the must, and which should be taken off with care every time it forms, so as to remove all those substances which alter the taste of the wine, cause fermentations, and do a great deal of mischief.

5. Care should be taken not to put the must into casks which are dirty, or which have been fumed with sulphur. There are some wine-growers who think that the fumes of sulphur applied to casks preserve the sweetness of wine, and there are ignorant purchasers who permit themselves to be cheated as to the quality of the wine, by the sugar which the unfinished fermentation has left in it without decomposing it. But the following summer these wines are found to be muddy and ferment often with great force, become sour, and are often completely spoiled. The wine, then, should be placed in casks which have not been fumed, and no obstacle to fermentation should be opposed, nor should it be arrested by the fumes of sulphur. There is no exception to this rule, save for those autumns which are unusually warm, and which cause fears that the fermentation will be too strong. In such case, the vessels may be fumed with sulphur.

6. The fermentation of red wine should be treated differently from that of white. The must of black grapes may remain twenty-four hours, with the stems mixed with it, so that the tannin contained in them may communicate itself with the must. At the end of that time, the stems and the seeds should be separated by means of a sieve, and the must should be poured into open vessels, which should be lightly covered during the fermentation. The temperature of the must during the fermentation, should not be allowed to exceed 15° of Reaumur (65¾° Fahrenheit), in order to prevent the spirit from escaping. Every three or four hours the fermenting mass should be stirred, so as to prevent it from souring.

7. At the end of fifteen or twenty days, when all action has ceased and the skins have yielded their coloring matter to the must, it should be put under the press and strongly squeezed, so that all the coloring matter shall be extracted. The wine is then placed in casks not fumed; and if it is desired to increase the capacity for tannin, some of the seeds, which should be separated by a sieve from the mesh, should be added to it.

8. If the weather is cold, the openings to the cellars should be closed, so that the fermentation may meet with no interruption. Persons should never enter the cellars until they have been tested for carbonic acid by a light. The carbonic acid may be driven from the cellars by opening all the issues, by lighting a fire on the stairway, by throwing hot water into them, and by scattering freshly-slacked lime in them. During the fermentation the bung-hole should only be closed with vine leaves, or by a little bag filled with sand—the object being to prevent the air from entering at the same time that the carbonic acid is permitted to escape.

9. Towards Christmas the clarification of the wine is about completed, and the yeast, which has become insoluble during the fermentation, is precipitated. Four weeks after the commencement of the fermentation, the casks, which should not be quite filled up at first, become completely full.

10. The racking or drawing off from the lees, at Christmas, is very important and necessary. There always remains in the wine, after the first fermentation, a certain quantity of soluble leaven, and if this is not scattered, and the wine still contains undecomposed sugar, the liquid will become turbid, it will ferment again, and possibly be spoiled. In the first racking, toward the commencement of the year, care should be taken to expose the wine as much as possible to contact with the air, in which case the oxygen of the atmosphere precipitates the insoluble leaven, and the liquid clarifies completely, so that the second racking may be retarded until the end of April, there being no further fear of fermentation.

11. The following autumn another racking should take place, after which the wine may be considered as completely made. In drawing off, great care should be taken not to mix the portion of the wine at the bottom of the cask, which is still turbid, with the clear part which is above. The turbid part should be placed in a separate vessel, and submitted to a new racking before it is added to the other.

The author of these rules closes by saying : "If our wine-growers will strictly observe these prescriptions, without permitting themselves to be turned aside by local usages, they will obtain beautiful and good wines."

The Inventor of Flax Cotton a Lunatic.

The insanity of Chevalier Claussen, the inventor of flax cotton, has already been announced, but the London *Spectator* thus sketches the sad story of his life :—

There is, or was until recently, a tall handsome man confined in a lunatic asylum at Camberwell. He used to sit mournfully for days and weeks in a corner of his lone room, little given to talk and less to physical exercise. Now and then, however, he broke out in a sudden blaze of excitement, repeating incoherent sentences, in which only the words "flax cotton" was distinctly audible. The unhappy man's name was Chevalier Claussen. By birth a Dane and a man of high scientific education, he gave himself up early to the study of practical chemistry, particularly those branches connected with the manufacture of textile fabrics. After years of labor and many experiments he came to the conclusion that the fiber of flax, if rightly manipulated, is superior to cotton for all purposes in which the latter is employed, and therefore ought to supersede it, as well on this account as being an indigenous plant, for the supply of which Europe might be independent of serf or slave.

Claussen's experiments were well received in his own country, and his king gave him the title of chevalier, but, unfortunately, little other substantial encouragement. The inventor then went to France, married a young French lady, was presented at Court and received the Order of the Legion of Honor; but again got little else but promises of future reward for the years of labor devoted to the one great object he had on hand. Somewhat weary of his work, and sorely pressed by poverty, Chevalier Claussen next came to this country, arriving just in time for the International Exhibition of 1851. He displayed in the Hyde Park Palace some beautiful articles made of flax cotton, and set all the world in raptures about the new invention, the more so as he freely explained the secret of the process for converting flax straw into a material equal in all, and superior in some, respects to the cotton fabric.

The manipulation was simple enough, according to Claussen's showing. The flax, cut into small pieces by machinery, was left for a short time to the combined action of alkaline solvents and of carbonated alkalies and acids, which converted the fiber into a material very similar to cotton, and fit even, to some extent, to be spun with cotton machinery. The English manufacturers to whom the process was explained were delighted; nevertheless, they refused with many thanks the chevalier's offer to work his invention. It was found that the flax cotton could not be profitably spun without making various alterations in the existing machinery; and to this the Lancashire mill-owners objected, saying : "Why should we trouble ourselves about the new raw material as long as we get cotton in abundance?"

With something of a prophetic vein M. Claussen remonstrated, arguing that the supply was not all to be depended upon, and that, besides, it would be better and cheaper in the long run to make European hands feed European mills, by the aid of perfected steam agencies, than to leave the task to the rude manual labor of unwilling bondmen. It was the voice of the preacher in the desert : Lancashire listened not; and when the Hyde Park Show was over, Chevalier Claussen and his invention were no more thought of than the man who discovered the compass. Sorely troubled in mind, and with abject poverty staring him in the face, Claussen then pursued his pilgrimage, crossing the Atlantic to America. What happened to him in the great western republic is not accurately known; but it is presumed that some 'cute natives laid hold of the young man from the old country, squeezing his brains and then throwing him overboard. It was rumored that Chevalier Claussen had got a "partner," and, not long after, somebody, partner or otherwise, brought him back to this country, shutting him up in a lunatic asylum at Camberwell. Here the history of flax cotton ends; the inventor is in a madhouse, Lancashire without food for her mills and her people.

To Relieve Muscular Pain in Horses.

The Datura Stramonium, or thorn apple plant, is a very excellent remedy, as an external application, for the treatment of muscular pain, ligamentary lameness, sprain of the fetlock, &c. It is a remedy of great efficacy in chronic pains and inflammatory tumors. Four ounces of the plant, to one pint of boiling water, are the proportions. When cool the parts are to be bathed often; when practicable a flannel is to be saturated with the fluid, bound on the affected parts, the whole to be covered with oiled silk.

[The above is from an exchange. Medical works state that stramonium as an outward application allays pain. It is used to make a salve by macerating it in hot lard, then straining it. It is applied to burns, scalds and is used for piles and bruises. The thorn apple is a deadly poison.—Eds.

Ventilation in Stables.

The great mortality occuring amongst the horses of the French cavalry has been diminished by more than one-half by increasing the amount of air supplied to the stables, no other change in the management having occurred. At the end of the Italian war, 10,000 cavalry were left with no stabling but mere temporary sheds: but the mortality was quite insignificant, and not a single case of glanders occurred. The French Government are now trying some experiments with respect to the results of the exposure of horses to even currents of air, some of the results having proved of a most favorable kind. As might be expected, the effects of the improved ventilation of stables have been still more fully exhibited with respect to sick and wounded horses.

Sweet Pickled Quinces.—The most common use of quinces is as sweet preserves. They also answer a good purpose when sliced up and mixed in small quantities with apple sauce, giving the whole a pleasant, aromatic flavor. They make a good pickle, also. Boil in vinegar with sugar, and add cloves, cinnamon, &c., to suit the taste. The best way is to pare and quarter them and cut out the cores. Boil ten pounds of fruit, adding five pounds of sugar, and about four pints of vinegar, one ounce of stick cinnamon, and one and a half ounces of cloves. When well boiled, put in a jar and pour over the sirup.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening, Oct. 16; Mr. Tillman in the chair.

MISCELLANEOUS BUSINESS.

More than the usual half hour was devoted to miscellaneous business; a large number of inventors having subjects of interest to bring before the Society.

Mr. DEMAREST presented a sewing machine, which was enclosed in a case about seven inches square and two inches thick, and which can be sold for five dollars. It sews a running stitch. The needle is stationary, and the cloth is corrugated and crowded upon the needle by a pair of cog wheels; the needle passing through the folds, and then the cloth is drawn along by hand upon the thread. The exhibitor said that this machine is designed especially for thin goods, which cannot be sewed well with the ordinary machine. He said that a person with one of these machines could do about seven times the work that can be done by hand.

The CHAIRMAN—I have the pleasure of introducing to the Society, Mr. Hamilton E. Towle, the engineer who devised the steering apparatus by which the *Great Eastern* was saved. He has a plan for ascertaining the form of ships' bottoms, which I presume will be interesting to the Society.

Mr. TOWLE explaned his plan. It consists in a simple frame to be drawn under the ship's bottom, and when it is so placed, a number of sliding rods which had been held in place by a catch are released, and are carried up by buoys fastened to them, till their ends come in contact with the bottom of the vessel. The catch rod is then drawn back, when it holds all of the rods in place, and when the frame is removed, the upper ends of the rods form an exact mold of the vessel's bottom. The plan was suggested by the apparatus in use by hatters for taking the size and form of a person's head.

FUEL IN THE ARTS.

The CHAIRMAN—The time has arrived for the regular subject of the evening, "Fuel in the Arts," and we shall be pleased to hear from any one on that subject.

Mr. FISHER—A few months since, I read in one of the English scientific papers (*The Practical Mechanic*, I think) an article on the use of petroleum as fuel in steamers, in which the writer urged the economy of space which would result from the use of this fuel. It has occured to me that, if this fuel can be bought at a price sufficiently low to be used, it might be stowed in iron steamers between the outer and inner skins of the sides. This space in the *Great Eastern* is, I think, two feet wide; and as it extends all around the vessel, it would hold an enormous quantity of oil. There would be some economy of labor in using this fuel, as, instead of being transported about the deck as coal is, it could be drawn by a pump through small pipes. In regard to heating the air which supports combustion, there seems to be a difference of opinion among authorities. In Siemens's furnace, the air and the gaseous fuel are both heated to some 1,300° before they are burned, and it is claimed that the heat is increased to the same extent. But Chas. Wye Williams says that there is no advantage in heating the air before it enters the furnace. We know that when the air began to be heated some 600° for iron furnaces, the process of making iron was accelerated. It was found that one bushel of coal used to heat the blast, did more good than several bushels on the grate. I have made no experiments myself, but it would seem as if there should be more intense heat in the combustion if the air was first heated. There is a difference of opinion, however, among authorities. Mr. Chairman, I will introduce to the meeting Mr. Coons, who will explain his apparatus for making gas for fuel as well as for light.

Mr. COONS—I have here, Mr. Chairman, a drawing of my apparatus. [The speaker proceeded at considerable length to explain his apparatus for making gas on a small scale. It possesses no feature of special novelty, but is claimed to be a compact, simple, and easily operated apparatus.]

Prof. SEELY—The habitual attendants of our meetings will remember that I have been talking from time to time for the last two years about the practicability of obtaining intense heat by burning compressed gases, or burning fuel in compressed air. The quantity of heat depends upon the amount of oxygen consumed, and the intensity depends upon the amount consumed in a given space. If we burn hydrogen gas in pure oxygen under the pressure of the atmosphere, we obtain heat sufficiently intense to melt platinum, but by compressing the gases into half the space we ought to have heat twice as intense. It is perfectly practicable to apply an additional pressure of fifteen pounds to the inch, or one atmosphere, even in an ordinary furnace, and by proper arrangements it may be carried to fifty atmospheres. This would give us a new power to work with. We may perhaps volatilize all substances, including platinum; and if carbon can be melted and diamonds produced, this is the way to do it. I see that within a few months, three or four persons in England claim to have invented or originated the plan of obtaining a high heat by burning with compressed air, and I wish to revive the recollections of the Society to my discussions of the subject.

I proposed this subject of fuel, Mr. Chairman, as I stated at the time, with a view of obtaining information in relation to the various new modes of burning petroleum, and I have been much edified by the remarks which have been called forth. I will add my share to the information elicited, by explaning an apparatus which I have devised and tried. It consists of a cup to contain oil, with a number of tubes passing vertically through the bottom, and open at both ends. The spaces between the tubes are filled with wicking, and of the various substances which I have tried for this purpose, I prefer sand. The oil is conducted by capillary attraction to the surface of the sand where it is lighted, and the air draws up through the tubes to maintain the combustion throughout the whole body of the flame. It is in effect a combination of argand burners. If used without a chimney, a blast is required. I was led to this plan by searches for some mode of burning petroleum in the air engine, and in my opinion this will be found the best plan for that purpose.

Mr. FISHER—Have the gases ever been heated for the oxyhydrogen blowpipe?

Prof. SEELY—Not that I am aware of. I do not think much of the hot blast, however; the expansion of the air tends to diminish the intensity of the heat; counteracting to a considerable extent the effect of heating the air.

The CHAIRMAN—I see in the room our old friend, Mr. Everett. He is now located at Cleveland, Ohio, as a manufacturing chemist, and has made a great many experiments on coal oil. He can probably give us some interesting information on the subject.

Mr. EVERETT—Coal oil is not now manufactured. Petroleum is so cheap that the manufacture of coal oil does not pay. We call the petroleum "coal oil" from habit, but it is a misnomer. I have nothing of interest to say in regard to either substance.

Mr. COHEN—I came clear over here from Jersey City, and have sat all the evening hoping to hear something about fuel, but I have been disappointed. I am a chemist, but at present am engaged in distilling at Jersey City. I have adopted some improvements in burning fuel, by which I save twenty-five per cent of the cost. This saving is effected by burning a cheaper material. I burn the fine coal dust. The only difficulty is in getting a man to feed the fire properly. The dust must be thrown in very frequently, and spread evenly over the grate. I formerly paid $12,000 a year for coal, but now it costs me $9,000. Yet I have to turn round and pay a man three or four dollars a week more, in order to get one who can fire with this fine dust.

Mr. OVERTON—I will remark in this connection, Mr. Chairman, that my fan is just the thing for blowing a fire with fine coal. Unlike other rotary fans, it has a piston which will work against pressure. I believe that all you can do in generating heat from carbon is to burn it completely—combine with each atom of carbon, two atoms of oxygen. And I will further remark that I believe the time will come when a far more intense heat will be used for generating steam, with a small extent of boiler surface. You have probably seen the accounts of the locomotive that was altered in Jersey City. The pipes were reduced in length one half, and the boiler made more steam.

Mr. DIBBEN—Was not the length of the fire-box increased to the same extent as that of the pipes was diminished?

Mr. OVERTON—I do not know how that was.

Mr. DIBBEN—It was.

Mr. FISHER—Several years ago a Mr. Bennett had an engine here in which the air was compressed, and I should like to know if there is any one present who is acquainted with the results of that experiment. The fire-box was enclosed and the air was forced into it by an air-pump; a safety valve opened when the pressure reached a fixed limit, and allowed the products of combustion to escape into the boiler. The engine was placed in a steamboat, and very good speed was obtained from a moderate sized engine. But the valves were cut out by the ashes, and the plan was abandoned.

Mr. CHURCHILL—I have found that the best plan for burning gas as fuel, is to surround the jet with a series of concentric chimneys. A slight draft is created through the annular spaces, and as the flame is spread out by the vessel above, over these spaces, the air comes in contact with it and completes the combustion. There is no smoke.

"Paper and its Manufacture" was selected as the subject for the next week, and the Association adjourned.

THE HOP IN ENGLAND AND AMERICA—BEER BEVERAGES.

Pleasant recollections arise as we behold the feathery clusters and graceful spirals of the climbing hop vine. Those who have spent their early years in some of our rural districts will remember the family hop vine that formed a familiar appendage to every homestead. In almost every land the harvest season presents scenes which are associated with rustic festivities and rejoicings. The merry Rhinelander goes forth dancing to gather the grape, and he comes home singing with his purple clusters; and in "Merry England" similar scenes may be witnessed in localities dovoted to the culture of the hop, which plays such an important part in the preparation of that ale which is the delight of the ruddy-faced Anglo-Saxon.

The last number of the London *Saturday Review* contains an article on M. Esquiros's work on "The English at Home," in which, a hop harvest scene in the county of Kent is graphically described as follows:—

At that period of the year, the vagabond shakes off his sloth, the wandering tinker puts out his fire, the beggar ceases to hold out his hand, the minstrel deserts his fiddle, the laborer bids farewell for a season to his plow, and all proceed to the hop festival. Then come together the poor man in decent clothes and the poor man in rags; the workman with an open face and the adventurer with suspicious looks—the honest man and the thief; still the latter does not steal, but works for a season. Among the women, the same contrasts are visible; sordid misery and coquettish misery; youth and old age; virtue and vice; but the latter now sanctified by virtuous employment. All these jostle each other along the road; from station to station, the parties stop to make their tea in the open air; the men, seated by the pot, smoke their pipes gaily, or sleep with their hats over their faces; while the girls ramble along the hedges picking nuts, or unharnessing the donkey, which drags in a small cart an old woman and a few household utensils.

Few sights, indeed, can be more exhilarating than a Kentish hop harvest. Little children, young girls, old men and young men are engaged in picking the hops, which are raised in large gardens. The hop harvest occurs in the loveliest season of the year, and jests, songs and merry laughter arise on every side. When the labors of the day are over, the hop pickers gather in clusters, tell stories and sing songs. Many an ancient, unprinted ballad, breathing love and bravery, is chaunted by the rustic vocalists. Many romantic attachments are formed at the hop harvest; all hearts seem to be happy, and each voice filled with melody.

The native English hop grows wild on the skirts of the wood. That which is cultivated was introduced from Holland during the reign of Henry VIII.

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It is a delicate and capricious plant, and requires a peculiar soil and careful culture. It costs about $350 per acre to lay out a hop garden; the vines are not ready for picking until four years after planting, and they wear out in ten years. The wages of hop pickers in England, are settled every season at a meeting of the hop-growers. They average three dollars per week, for a man, but they vary with the seasons.

In America, the hop is cultivated upon a somewhat extensive scale in some districts, such as in the beautiful valley of the Mohawk, where Herkimer and Oneida counties have acquired distinction for their large hop vineries. In these localities the hop harvest is also a pleasant season, but no such scenes as those witnessed in ancient Kent are to be found. There is an absence of that unrestrained mirth exhibited by the English hop pickers, but on the other hand, no vagabonds nor abandoned characters are employed in our hop fields. Respectable country lads and lasses from the surrounding villages gather in our hop harvests. In Herkimer county, the hop vines are trained in several instances upon strings, which run up from stakes set in the ground, to cross wires above, the latter being run from posts set at a distance of about eight rods apart. When the hops are ready for picking, the wires and strings are loosened, and the hops can then be removed with facility.

At the present time, the hop product of the United States, reaches to about nine million pounds per annum, most of which, is raised in the State of New York. In England, the annual hop product averages 40,000,000 pounds. The quality of hops is judged of by their weight. A resinous substance, in the form of minute globules, found near the base of the hop scales, contains the essential principles of the hop. It has a bitter taste and a peculiar fragrance. The fibers of the hop plant are sometimes woven into coarse cloth. Hops are believed to have medicinal virtues. In weak fermented malt liquors, they are prescribed for dyspepsia, but their chief use is in the preservation and flavoring of beer. The vast increase in the consumption of lager beer in America has led to a great increase in the cultivation of the hop. In ten years, the quantity has been quadrupled.

M. Esquiros, who is a Frenchman, considers that the barley beer of the Englishman exercises a great influence upon his character, tending to make him strong, patient, reflective and obstinate. "As a nation drinks," he says, "you may form an estimate of its life." Beer was a mighty favorite with the old Danes and Saxons. There are no less than 100,000 ale-houses in Great Britain. These present a striking index of the tastes and habits of the people. Englishmen glory in the vigor of their beer. One of their orators exclaimed at a public meeting, "Beer and wine met at Waterloo; wine red with fury, boiling over with enthusiasm, mad with audacity, rose thrice against that hill on which stood a wall of immovable men, the sons of beer; you have read history—beer gained the day."

According to Chevalier's and Payen's analysis of hops, they contain of volatile oil, 2.00 parts; lupulin, 10.30; resin, 55.00; lignia, 32.00, and traces of a peculiar wax, malic acid and alkaline salts. Lupulin, is the astringent bitter principle of the hop, and this, with the aromatic oil, are the only constituents of the hop which enter into the composition of beer. In making beer, the hops are added to and boiled with the wort. The ales manufactured for hot climates have a great deal more hops added to them than those designed for cold climates. The quantity of hops used in beer, varies from four to eighteen pounds per quarter (eight bushels) of malt. Beer contains gum, sugar and starch, but it is generally believed, that the lupulin of the hop is its principal tonic ingredient. Munich or Bavarian beer, which has a very high reputation, is composed of water, 87.33; malt extract, 7.97; alcohol, 4.50; carbonic acid, 0.20. London pale ale contains 89.85 water, 4.50 malt, 5.65 alcohol. American-made lager beer contains from 91 to 92 of water, 4.70 malt, 4.34 alcohol, 0.11 carbonic acid. American pale ales are superior to the English, but they are not thus generally estimated, upon the principle, we suppose, that "far off birds have feathers fair." To produce forty barrels of lager beer, fifty bushels of malt, sixty pounds of hops, and three gallons of yeast are used. Brewing is only conducted during the cool season of the year. The period of operation is from the end of October to the early part of April. It is estimated, that about 4,000,000 gallons of lager beer, are annually consumed in New York and its vicinity. There are from seventeen to twenty lager beer breweries in Williamsburgh (Eastern District of Brooklyn), one section of which is called Dutchtown, and is inhabited exclusively by Germans, who smoke their pipes, drink their lager, play dominoes, discuss deep subjects of politics, and speak the language and keep up the customs of Faderland.

VALUABLE RECEIPTS.

To Analyze Gunpowder.—Take 100 grains of gunpowder and mix it thoroughly with distilled water until all the saltpeter is dissolved. The solution is now poured into a filter of clean paper, when the saltpeter with the water passes through into the vessel below. By evaporating the water over a spirit lamp the saltpeter will be left behind as residue, which when weighed will give the exact quantity. The sulphur and charcoal mass of the powder left on the surface of the filter-paper is now scraped off, placed in a copper disk and heated to 240° when the sulphur disengages itself in fumes leaving the charcoal behind, which when weighed will give the quantities of saltpeter, sulphur and charcoal of which the powder is composed.

Sulphuret of Carbon.—This is a colorless, thin liquid, of a peculiarly disagreeable odor. Its chemical symbol is $C S^2$, and its specific gravity 1.272. It is insoluble in water and boils at the low temperature of 108° Fah. It is soluble in alcohol, ether and oils; but it is a solvent of great power itself. It dissolves camphor, amber, gum mastic, resins, india-rubber and volatile oils, and it may be made very useful in the preparation of resinous varnishes, because it evaporates so rapidly in the atmosphere. It is made by bringing sulphur fumes into contact with red-hot charcoal in an earthenware retort. The gas produced by the combination of the sulphur and carbon in the retort is conducted through a refrigerator when it is condensed into liquid among water. It is combustible and burns with a blue flame.

Wax Varnish.—Take pure white wax, 1 pound, and melt it slowly in a porcelain vessel under a very gentle heat, then add a pint of warm alcohol and mix the two as intimately as possible. The composition is now poured upon a cold porcelain slab and ground with a muller until it has become very smooth, when it is thinned with whisky, strained through a cloth and in this condition it is called milk-of-wax. It may be used as a varnish for paintings and is considered the best protective for water colors. Many of the ancient paintings owe their freshness to this varnish. Three ounces of wax dissolved in a pint of turpentine makes an excellent polish for furniture that has not been varnished with copal or any of the common gum varnishes.

ENGLISH METHOD OF BENDING PLATES FOR SHIPS' ARMOR.

A new method of bending iron plates for ships' sides has been invented by a workman in an English navy yard. It is described as very much facilitating the work, but it is, in reality, much more costly, more cumbersome, and less expeditious in every way than the methods in use at our own machine shops. The machine referred to is provided with an "ordnance box," for taking the mold for the curve of the plate. This box is a wide piece of iron standing on its edge, through which a number of bolts are screwed up against the ship's side until the exact curve is obtained, the bolts are then fastened with screws and rendered immovable. In connection with this apparatus is another for obtaining the levels and curved edges of the ship's side; it is made of polished iron, very flexible, so that it conforms to the curve, when, by movable pieces of iron, crossways and lengthways, the levels are taken; the instrument on being removed returns immediately to its flattened shape, the edge only retaining the peculiar form given to it by the ship's side. The mold being thus taken, it is transferred to the machine that actually makes the curves, which consists of an iron box fitted with a number of pieces of iron about an inch square and ten inches long; these, by means of screws in the box bottom, can be raised or lowered until they resemble the mold which has been placed upon their ends. The "peppots" are then secured in their position; another framework is now provided, which has smaller "peppots," arranged in reverse order to the first; when the plate to be bent is heated and laid on, a framework is drawn out on a railway, and the plate drawn down upon the "peppots" aforesaid by a lever, the upper "peppots" are thrown into contact with the armor with great force, and the end is attained. This plan is said to possess great advantages over the old method, which was to take a wooden mold from the vessel, said mold being only 3½ feet wide, 4½ feet thick (?) and about 15 feet long.

[The above method, copied carefully from an English journal, if it represents properly the means in use for bending armor plates, is certainly rude and clumsy enough; we suspect, however, there are some inaccuracies, as it certainly is not very intelligible; whatever "peppots" may be, no such term is known to us. The wooden molds used in transferring the *fac-simile* of the *Roanoke's* side are not cumbersome or costly. They represent a wooden skeleton of the plate as it goes on the ship, and they can be readily handled by one man, or at the most two; this skeleton is then laid upon a screw press having movable dies, fixed in the center but loose on each end; as it lays there, winding and twisted, with the beautiful sweep of the bow, the dies—strong heavy bars of cast iron—are quickly raised to the templet until every part of them touch it; the templet is then removed and the massive top bed, with its movable bars, is lowered by a jack, and these accommodated to the lower ones. The press is then ready for the plate, which has been heating by the side of it. Three men could do the whole work of setting the press.—Eds.

Business in War Times.

The Bangor *Times*, in a recent issue, had some sensible ideas in relation to the prosecution of general business, and the carrying out of public enterprises in war time. So appropriate are these remarks that, with a slight change, we give them a place in our columns. Says that paper:—

Many people seem to suppose that because we have a great war upon our hands every one must stand back and look on as an inactive speculator—that he must enter into no speculations and exhibit no enterprise. This is an erroneous idea, and should be corrected. There are serious duties for those who remain at home. We must keep up and if possible increase our usual spirit of business enterprise so that we may be able to sustain those we send to the field. We owe it to the country and to our soldiers as well as to ourselves, that we be active and vigilant in all that shall help to sustain the business prospects of the country. There never was more money in circulation in the country than now, and business need not be allowed to suffer seriously for want of support. The trouble is that attention being withdrawn to the movements of the armies, immediate business and social enterprises are neglected in proportion. We are all engrossed with the one idea of the war and our energies are suffered to lie dormant. Retrenchment in private and public amusements is commendable and highly proper at this time. But there is danger that our people will run into the extreme of unthriftiness, losing confidence in all enterprises of a private nature, and then, that we shall lose confidence in the national ability. It does not take long, when once a people get started on this down grade, to ruin a State by universal private doubts and dejection. We repeat, we who remain at home have our duties to perform, serious duties too. Upon us devolves the burden of sustaining this war by all the material aid at our command, and all that private enterprise can possibly produce. It is the business of communities that goes to make a nation strong and durable, in war as well as in peace, and this community has only to sustain its usual reputation of thrift, to do its share in giving confidence to the affairs of the country.

Prussia intends to become a strong naval power. It is officially announced that within seven years she will have a fleet of seventy men-of-war, carrying five hundred and sixty-eight guns. The Baltic is to be the principal maritime station, the Government having selected the port of Jasmund in the Island of Rugen. The cost of the fleet and the dockyards is estimated at fifty millions of dollars.

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Correspondence

Natural Forces—Dynamical Theory of Electricity, Light and Heat.

MESSRS. EDITORS :—I was deeply interested in reading the lecture of Professor Tyndall on "Force," published a short time since in the SCIENTIFIC AMERICAN. To such subjects I have devoted much attention, and in connection with them, have been led to investigate the Mosaic record of the creation, more especially as it relates to the forces by which the Creator brought motion and inorganic and organic forms and functions into existence.

Heat, light, electricity, magnetism and gravity have been considered distinct natural forces. I believe that electricity is a primary principle pervading all matter, and its various phenomena are produced by the various physically constituted bodies in which it resides actively or passively; and through or upon which it vibrates.

Light, heat and magnetism are only modifications of electricity. It is subject to the laws of expansion and condensation. It cannot be made visibly manifest to the senses without the action of some agency, or an object to act upon. The quantity of latent heat which material bodies contain in a state of rest, or are capable of absorbing, is in proportion to the sum of their density added to their respective volumes and conducting power. The quantity and intensity of heat generated by bodies in motion is as the sum of their bulk and density, and their conducting and non-conducting powers in connection with their respective velocities. All substances upon which they impinge become also participants of the heat generated by that motion in proportion to their own bulk, density, conducting and non-conducting powers. The quantity and intensity of sensible heat in all natural bodies, excited by the sun and chemical causes, are in proportion to the sum of their own individual volumes added to the sum of the squares of their density; and inversely.

The volumes and density of material bodies are true criterions of the quantity of electricity they contain in a state of rest, and the quantity and intensity of excited electricity in those bodies are in proportion to the sum of the power applied, added to the sum of the squares of their respective volumes and density; or, to the cube root of the sums of their volumes and specific weight; and *vice versa*. Therefore, light and heat at the beginning of creation were generated in proportion as the electrical and chemical operations of the earth progressed, until a proper equilibrium was attained and the solids of the earth were fully formed.

The light spoken of by Moses in the beginning of creation, on the first, second and third days, was without doubt produced by electric and chemical action and motion in the watery abyss while the solids were forming. I have come to the conclusion that what we have hitherto called solar heat depends as much upon the chemical constitution of the earth and the atmosphere as it does upon the sun itself, and that motion is intimately connected with light and heat. In fact it is difficult to separate motion from light and heat either in a philosophical or a mechanical sense.

Water is either combined in all the compounds of nature in the mineral, the vegetable and the animal kingdoms, or, it has been a necessary and a positive agent in their formation; therefore, water must have existed before the three great kingdoms of nature were developed. And, in the formation of water at the beginning of creation, as the first natural compound, inceptive motion and light and heat were the results. The watery abyss then was the womb of nature, which contained in solution or suspension all the simple elements which now form this beautiful earth, and the great variety and complex productions of its minerals, its vegetation, and its animal creations.

Water is the *inceptio* and the *ultimarratio* of nature's chemistry. And this fact is fully established by modern science; inceptive heat, light and motion being the results of its chemical formation at the time when the spirit of God is said to have moved upon the face of the waters. T. Q.

The Exploded Locomotive Boiler.

MESSRS. EDITORS :—In No. 16, Vol. VII. (new series) of the SCIENTIFIC AMERICAN, I find an article headed "Remarkable Locomotive Boiler Explosion." In that article it is said it was a Rogers's Paterson engine and about six years old. This statement I believe to be a mistake, for the reason that the Rogers Works at Paterson never built an engine for the Cleveland and Toledo railroad, and I have not heard of them buying a Rogers's Paterson engine from any other road. I think it probable that the engine was a Rogers's Cleveland one, as the company have engines of that make, and your engraving has more the appearance of a Cleveland than of a Paterson engine. With regard to the causes of boiler explosions generally, I am satisfied that they occur oftener from overpressure, or insufficient strength to sustain the strain upon them, and that the various theories or suppositions about decomposition of the steam and the generation of explosive gases in the boilers are not true in fact. Low water, causing overheated plates, together with any sudden absorption of the heat from the overheated plates, by the water being pumped or thrown upon them by any cause, may result in explosion from the sudden generation of a greater amount of steam than the steam space can hold, the pressure being increased in proportion as the steam space is too small to contain the quantity suddenly generated. In cases of this kind no ordinary safety valve is sufficient to relieve the pressure quick enough, consequently the boiler gives way, and the destruction is greatly augmented by the water being thrown with the velocity imparted to it by the steam. W. S. HUDSON.

Rogers's Locomotive and Machine Works, Paterson, N. J., Oct. 25, 1862.

Hair and Sea Grass for Upholstery.

MESSRS. EDITORS :—In the SCIENTIFIC AMERICAN of October 18th. you have, unintentionally I believe, done injustice to a respectable class of honest manufacturers, in an article entitled "Seaweed in place of hair." It is stated in it, with respect to mattresses, sofas, chairs, &c., that "the best articles of this kind are stuffed with seaweed, sufficient hair being used to conceal the former and avoid detection."

I have worked in a large establishment in the city of Brooklyn, for several years, and I know that nothing but pure hair is ever used for stuffing any kind of work manufactured there. No honest man would stuff mattresses, sofas, or chairs with sea grass, even partly, and sell them for hair-stuffed articles. Your course in conducting your highly valuable paper has always been honorable, and I have confidence that you will not do injustice intentionally to any person. L. WHITEHEAD.

Brooklyn, N. Y., October 12, 1862.

[It was not intended to have said that the best articles of upholstery work are partly stuffed with sea grass, but that many articles which are put before the public as being stuffed purely with hair are stuffed in the manner we have described.—EDS.

Questions About Boiler Explosions.

MESSRS. EDITORS :—Will you inform me, through your valuable paper, whether you have ever known of the explosion of a steam boiler to do any considerable amount of damage when it could be proven, beyond all doubt, that there was plenty of water in the boiler, and the safety valve properly adjusted and in good order? The above questions suggest themselves to me from hearing the various speculations in regard to an explosion in this place, a few days since, by which the engineer was instantly killed, the boiler torn asunder, and the engine house and adjacent parts of the grist mill attached, totally demolished. I am a practical engineer, and have had considerable to do with steam boilers for a number of years, and I would like very much to hear the expression of your ideas on the subject. J. O. L.

Jacksonville, Ill., Oct. 11, 1862.

[We cannot recall, at the present time, any accident occuring under circumstances precisely similar to those mentioned by our correspondent. The water question is one exceedingly difficult to prove, all engineers and witnesses asserting, on the occasion of an accident, that there was a sufficiency of water in the boiler. In a boiler working every day, the water line can be traced very clearly on the inner surface of the shell, the steam surface being black and shiny, while the water space is of a muddy white, rendered so by the ebullition of the water, as any practical engineer who has been down a "man-hole" well knows. Our leading engineers assert that there have been such instances as our correspondent speaks of, but in the case of an explosion it is difficult to say, positively, where the water line was, as the shock disengages the scale and obliterates the marks. Boilers are usually, or in too many cases overtaxed; they go on losing in strength from day to day, until they finally give way in the weakest part, whether it be the legs, crown sheet, shell or flues. A proper attention to the feed, the pressure and the braces of a boiler will insure safety in most cases. All of our experience, and we have had some, with boilers, goes to prove that neglect and carelessness have been the cause of danger, sometimes in slight things, at others in vital matters. We would call our correspondent's attention to the article on page 249 of this paper, present volume.

Egyptian Engineers.

The correspondent of the *London Engineer*, at the Great Exhibition, England, thus relates an account of barbarian engineering :—

I remember, when coming down the Nile in 1847, hearing a capital story of Egyptian engineering in those days. Mehemet Ali was the first to introduce steam navigation on the Nile, and, determined to have the natives instructed in the mystery of working the engines, a small steamer of about ten-horse power was, after many lessons from an English engineer, handed over to a native crew. On the first voyage thereafter a leakage took place, in consequence of the lower joint of the safety valve giving way. The natives applied the universal panacea for all wounds and bruises, a handful of Nile mud, this proving inefficient, a second and third dose of the same styptic was applied; finally bricks and mud were built over it, but all to no purpose; at last, when quite a pyramid of bricks and mud failed, and the steam continued to rush out worse than ever, they gave it up in despair. "Allah! Bismillah!" they exclaimed, "who can contend with fate?" So saying they leaped overboard and swam to the bank, where they quietly smoked their pipes until the fires burnt out and the steam went down.

Cotton and Wool.

The high price of cotton has affected the price of wool, especially as a far greater amount of woolen flannels are now manufactured than at any other previous period. With respect to the demand for wool in Western Virginia, where sheep-raising has been carried on somewhat extensively, the Wheeling (Va.) *Intelligencer* says :—

There is great excitement in the wool market hereabouts at this time. The number of dealers in the article have increased in proportion to the increase of the crop, which is much larger than in any previous year. Wool buyers are visiting all parts of the country, and the contest between them is very warm. Heretofore the fleeces have been in the possession of a few individuals, but now every farmer has become a wool raiser. The prices range from forty to forty-five cents per pound, according to quality, some fine fleeces commanding a better price. The article seems to be going up.

ORIGIN OF WORDS.—Very many words in common use may be traced to the names of places where they originated, such as bayonet from Bayonne, France, cambric from Cambray, diaper from d' Ypres, and martinet from a strict French officer of that name, who had, at one time, the regulation of the French infantry. The word carpet is from Cairo, where it was first woven, and *tapeto*, the Italian word for tapestry, so that carpets are literally Cairo tapestry.

HORSE POWER.—The origin of the term horse power, as applied to steam engines, is said to have arisen when they began to supersede horse mills, the manufacturer naturally inquiring how many horses they could dispense with. The expression is more practical than scientific, and the definition has at least the merit of probability.

THE mint in Philadelphia coins daily about $2,000 of nickle cents, all of which are distributed as soon as made; but still they are scarce. Where do they go?

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London Exhibition—Chemistry and Pharmacy.

The following interesting description is by C. W. Quin, F.C.S., and published in the *Druggist and Chemist*:—

Specimens of disentegrated graphite, exhibited by Professor Brodie of Oxford, are purified by his patent method. He mixes the graphite in powder with certain proportions of sulphuric acid and chlorate of potash in an iron pot, heating the mixture until chloric acid ceases to be evolved. He then adds a small portion of fluoride of sodium, which dissolves all traces of silica or alumina that may be present, and washes the matter copiously with water. It is then heated over a water bath, and the graphite exfoliates in the most remarkable manner, swelling into singular shapes many times its original size. The graphite so prepared is compressed and made into pencils. Next to Professor Brodie's case is that of Mr. Church, containing an interesting series of raw chemical products, many of them the discovery of this young chemist. A small specimen of solid sulphuric acid or sulphuric anhydride, as the new school term it, a large quantity of glucina enough to make half-a-dozen large emeralds, some cholestrine, cespitine, hippuric acid, naphthylamine, and several phenyl and ethyl sulphites will be regarded with interest by the scientific chemist. The block immediately opposite is occupied by Mr. Rumney's illustrations of the improvements made in dyeing and calico printing since 1851. On the counter beneath we have copious illustrations of the chemistry of the subject, in a series of bottles containing the dyes themselves and the chemical substances from which they are made. They require careful examination, as well as the wonderful series of principles obtained from madder and indigo by Dr. Schunck, contributed by the Manchester Philosophical Society. Most of these are Dr. Schunck's own discoveries, and the colors of the silken skeins surrounding Dr. Schunck's case are about the most gorgeous that have ever been seen by mortal eye. The next block contains the magnificent show of Messrs. Perkin's mauve dye, the substances from which it is obtained and the uses to which it is applied. On the left-hand side of the case is an immense block of mauve paste, worth over a thousand pounds, which has been produced from 2,000 tuns of coal; on the other is a large jar containing one grain of the paste dissolved in two gallons of water, to show the intensely colorific property of this material. On the right side, above the block of paste, is another jar containing about two gallons of crude coal tar, the exact amount necessary to produce ten grains of mauve dye. On a long shelf at the top of the case is ranged a series of bottles illustrating the manufacture most completely. It commences with the coal tar, from which the coal tar naphtha in the next bottle is produced. Next come benzole and the nitro-benzole, which it yields on being combined with nitric acid; and further on, the aniline which is produced from it by means of acetic acid and iron. The aniline being combined with sulphuric acid gives sulphate of aniline, which, when submitted to the action of bichromate of potash, gives the black precipitate from which the dye is extracted by alcohol. The black residue remaining, which is used for printing ink, and the bye products, sulphate of potash and oxide of chromium, bring the series to a close. There are three fine blocks of hydrate of soda, made by Messrs. Roberts, Dale & Co.'s patent process. Instead of using ordinary water in the boilers of their steam engines, they use solution of soda mixed with lime. By this means they keep their boilers perfectly clean. The specimens of oxalic acid exhibited by them are also very fine. This substance, so much in requisition as a discharge by calico printers, is made by them in many tuns per week by roasting sawdust, potash and soda together. By washing the mixture they obtain, in the first instance, oxalate of potash and soda, from which they throw down oxalate of lime. This they mix with hydrochloric acid, and crystallize out the oxalic acid in large crystals of great purity.

Passing onward we come to the fine display of coal-tar products contributed by Messrs. George Miller & Co., of Glasgow, prepared by C. Greville Williams. The most striking object in the case is the chinoline blue, that lovely but fugitive color that made such a sensation at the balls and parties of the nobility last year and the year before. The base from which it is derived, and from which it receives its name, is also shown along with several other naphthalic products, magenta crystals and picric acid. These are mostly displayed in a manner well deserving the attention of chemists. The substances are contained in glass bulbs terminating in a foot which fits into a brass stand, at the base of which are affixed the names of the substances shown.

The case of Dr. Stenhouse, in a scientific point of view, may be regarded as the gem of the whole Exhibition. It contains forty or fifty most rare and interesting substances, many of which have been discovered by this eminent chemist. The French chemists were frightened when they saw this magnificent display, and about three weeks after the opening of the exhibition, there suddenly appeared in a corner of the case of M. Menier, in the French Chemical Department, a series of synthetical organic compounds from the laboratory of M. Berthelot. Perhaps the most striking of Dr. Stenhouse's specimens are the products obtained from the mosses which yield cudbear, litmus, and orchil. These coloring matters do not exist ready formed in the lichens, but are generated by the chemical action of the materials employed in their manufacture. Thus the lichens from which orchil is obtained contain, amongst other substances, a colorless neutral body called *orcin*, which under the influence of ammonia absorbs oxygen, and is converted into an azotized substance termed *orcein*, possessed of powerful tinctorial properties. Dissolved in potash or ammonia it yields the orchil of commerce. *Usnic acid* is obtained from a lichen belonging to the genus *Usnea*. Boiled with excess of alkali it yields *beta orcin*, a substance analogous in its properties to *orcin*. *Erythromannite* is a kind of sugar obtained from the *Roccella* by boiling the lichen in lime water, passing carbonic acid through the solution to remove the excess of lime and evaporating the sirupy mass to dryness. The orcin is removed by ether, and the erythromannite remaining is recrystallized. The crystals shown of this substance are magnificent, many of them being nearly an inch across and almost perfect in their crystalline form. The origin of *purree*, or Indian yellow, has long been a puzzle to the chemist and merchant. It is pretty generally understood to be produced from the urine of cows, fed at certain times of the year in pastures producing yellow flowers possessed of strong tinctorial powers. The *purree* of commerce consists of *purreic* or *euxanthic acid* in combination with magnesia. Dissolved in hydrochloric or acetic acid, it yields crystals of *euxanthic acid* of a pale yellow color. These, when heated in a tube to 212°, decompose and sublime—as *euxemthone*. The specimen of *myroxocarpine*, or white Balsam of Peru is peculiarly fine. A fine specimen of *nitro theine* in splendid crystalline scales is also shown. This curious substance is produced from a solution of therin, by passing a current of chlorine through it. *Larixin* is a peculiar substance lately discovered in the bark of the larch by Dr. Stenhouse. It is remarkable for its lack of affinity for other substances, it being only with the greatest difficulty that it can be made to form compounds of any sort. A specimen of the resin of the *Xanthorrea* is interesting from the fact of its yielding picric acid when treated with nitric acid. It is seldom one sees so many rare substances proceeding from so famous a laboratory.

Preservation of Building Stone.

The *Chemist and Druggist* says of Dr. Graham's "dialysis:"—

Although but comparatively a short time has elapsed since their publication, several practical applications of them have already been made. One of the most important of these is Mr. A. Church's proposal for preventing the decay of building stones by atmospheric influence.

In this process, the stone is firstly impregnated with a solution of pure baryta, and is then acted on by a solution of silica, which is obtained by decomposing silicate of potash or soda, with hydrochloric acid, and then dialysing, so as to get rid of chloride of potassium or sodium.

The limestone or dolomite, to be preserved, is first brushed over with the solution of baryta, until it ceases to be absorbed, and, a few hours after, with the solution of silica. The result of the mutual reaction of these two solutions is, that a perfectly insoluble silicate of baryta is formed in the substance of the stone, which resists all atmospheric and hygrometric influence. The pre-eminent advantage of this plan is, that no soluble or destructible materials are introduced into the stone to be preserved; this is a point of very great importance, for when any soluble salt, particularly one which is either deliquescent or efflorescent, is produced in the texture of the stone, along with the materials that are intended to have a preservative influence, the former are either dissolved out by atmospheric moisture or crystallize on the surface in an efflorescent form, and in this manner tend to accelerate the very evil they were designed to prevent.

Rapid Growth of Vegetables in Norway.

In a valuable treatise on the vegetable productions of Norway, which has been published by Dr. Mueller, in connection with the Norwegian department of the Exhibition, some extraordinary facts are related respecting the influence of the long duration of light, during the summer months, on the growth of vegetables in the higher latitudes in Norway. At 70° N. it was found that ordinary peas grew at the rate of three and a half English inches in twenty-four hours for many days in summer, and that some of the cereals also grew as much as two and a half inches in the same time. Not only is the rapidity of growth affected by the constant presence of light, but those vegetable secretions which owe their existence to the influence of actinic force on the leaves, are also produced in far greater quantity than in more southern climates; hence the coloring matter and pigment cells are found in much greater quantity and the tint of the colored parts of vegetables is consequently deeper. The same remark applies to the flavoring and odoriferous matters, so that the fruits of the north of Norway, though not equal in saccharine properties, are far more intense in flavor than those of the south.

How they Fire in Battle.

An army correspondent says:—You wonder whether the regiments fire regularly in volley, or whether each man loads and fires as fast as he can. That depends upon circumstances; but usually, except when the enemy is near at hand, the regiments fire only at the command of their officers. You hear a drop, drop, drop, as a few of the skirmishers fire, followed by a rattle and roll, which sounds like the falling of a building, just as some of you have heard the brick walls tumble at a great fire. Sometimes when a body of the enemy's cavalry are sweeping down upon a regiment to cut it to pieces, the men form into a square, with the officers and musicians in the center. The front rank stands with bayonet charged, while the second rank fires as fast as it can. Sometimes they form in four ranks deep—the two front ones kneeling with bayonet charged, so that if the enemy should come upon them, they would run against a picket fence of bayonets. When they form in this way, the other two ranks load and fire as fast as they can. Then the roar is terrific, and many a horse and his rider goes down before the terrible storm of bullets.

Chronometers.

Professor Airy has recently made an interesting report to the British Government, involving the results of his examination of various chronometers. Professor Airy says that the material and workmanship of all the chronometers is very good, there being amongst nearly all of them but very little difference in this respect; and, in uniform circumstances of temperature, every one of the chronometers would go almost as well as an astronomical clock. The great cause of failure is the want of compensation, or the too great compensation for the effects of temperature. Another very serious cause of error has its source in the oil, which is injured by heat. This is very different in different cases. Thus the oil employed by one chronometer maker is not at all injured by heat; while some of that used by another chronometer maker was found to be so bad that, after going through the same heating as those of the first mentioned maker, the rates of the chronometers were changed, on returning to ordinary temperature, by eighty seconds per week.

A Tunnel is now being made under the river Indus, to form a link in the great chain of railroad between Calcutta and Peshawur. Native soldiers are employed upon the work.

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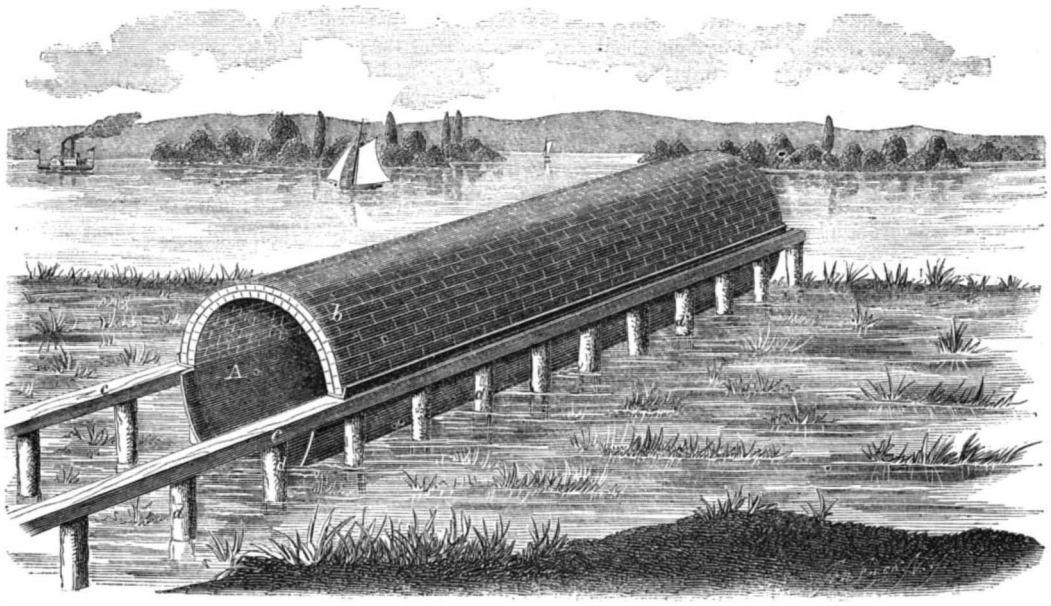
Improved Suspension Culvert.

One of the most disagreeable of all engineering operations is the construction of culverts in swamps and quicksands, and where coffer-dams are required to keep out the water, their construction and use is a matter of no small expense. The annexed engraving illustrates a plan by which culverts may be constructed either in marshes or quicksands in a cheap and substantial manner, and without any occasion for coffer-dams.

It consists simply in forming the lower arch of the culvert of iron—either cast or wrought; and where piles are required, in hanging this lower arch by flanges on stringers which are supported on the piles.



M'INTIRE'S SUSPENSION CULVERT.

The plan is so plainly shown in the engraving that a description is hardly required. A represents the lower arch of iron, with the flanges at its upper edges resting upon the stringers, *c*, supported by the piles, *d d*. The masonry arch, *b*, rests upon the flanges of the iron arch, A.

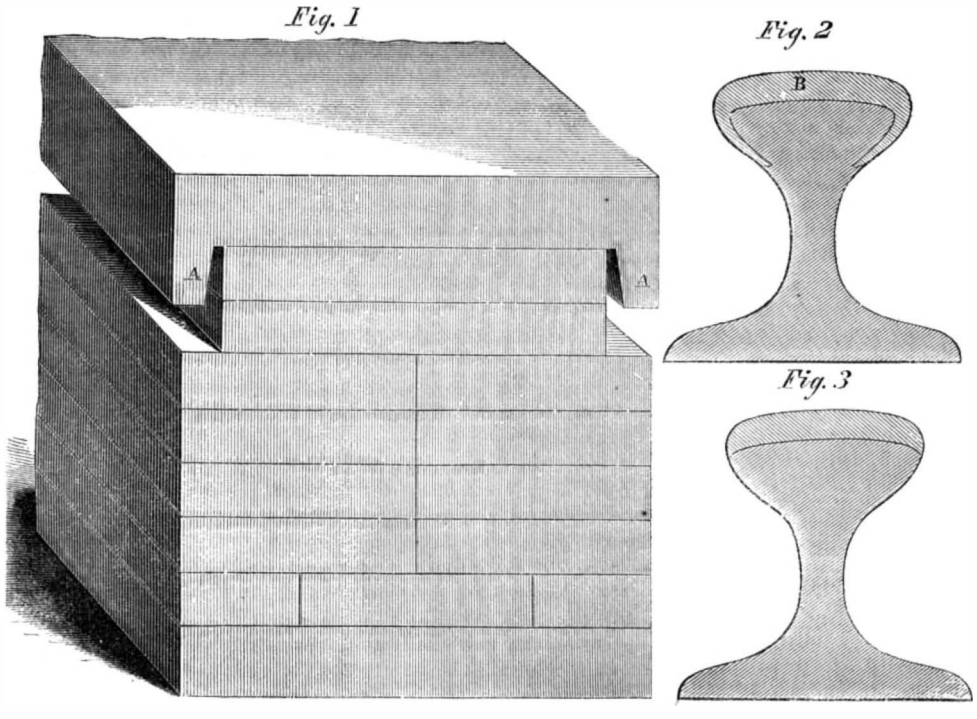
The iron arch may be perforated with small holes in case it is desired to admit water for drainage.

The inventor claims that this culvert can be constructed for about one half the expense of the common masonry culvert, and that in many situations it will be much less liable to destruction.

The patent for this invention was granted Sept. 16, 1862, and further information in relation to it may be obtained by addressing the inventor, Charles McIntire, at Easton, Pa.

Improved Pile for Rolling T-Rails.

In operating lines of railway the renewal of the rolling stock and of the rails themselves, required by their natural wear, involves a heavy annual expense. In laying the rails a space is left between the ends of one-fourth of an inch more or less, to allow for the expansion and contraction of the same during heat and frost; this causes short breaks in the line, and as the heads of the rails become depressed or elevated as the case may be, by the partial giving way of their supports, the wheels impart a blow in their passage to these projections which in a short time batters the end up, or else raises a long thin ribbon from the surface, which soon accomplishes its destruction and demands renewal; this is called lamination. The peculiar rolling attrition produced by the wheels makes a fine surface which, in dry weather, causes the train to bite well; when, therefore, this surface is destroyed by the cause above-mentioned, the iron oxidizes rapidly and becomes valueless. To prevent the mischief referred to, Messrs. John Price and William Lewis, of Danville, Pa., have invented the pile illustrated in Fig. 1. It consists, as will be seen, of several pieces; the bottom plate being the width of the intended pile, while the second course is divided into three pieces; the next four layers are in two parts, while the remainder run entirely across; the top or crown-piece, however, has two flanges, A A, these do not bind tightly against the fabric, but have a space between them; the length of the flanges is such that they lap slightly over the edges of the course below. Now, when the operation of rolling commences, these flanges are pressed down into the recess, thereby incasing two layers; the lap of the jaws over them prevents the pile from being displaced when charging into the furnace. The ends attained by this method of piling are these: the rails are made, as the inventors claim, thoroughly homogeneous throughout, and the fibers so closely interlaced that striation is rendered theoretically impossible.



PRICE & LEWIS'S PILE FOR ROLLING T-RAILS.

In Fig. 2 B represents a finished rail in section, made by the new process, in which the flanged layer of the pile is formed completely around the top, and runs well down toward the stem. Fig. 3 is a section of the rails made upon the old process, in which the surface merely joins the body or stem, without that security which Messrs. Price & Lewis claim is given by their invention. By using the flanged course on a pile at the top and bottom, I-rails may be constructed on the same principle, any modification in the size desired can be made when forming the pile.

Further particulars respecting this invention can be procured by addressing the patentees as above. The patent was issued through the Scientific American Patent Agency, Oct. 28, 1862.

Arrangements are being made to carry petroleum from the oil springs of Canada West in iron tank cars, on the Grand Trunk Railway, and down to Portland, Maine, thence to be shipped to Liverpool.

LABOR-SAVING INVENTIONS WANTED.

The great industrial wants of the country demand an increase of mechanical inventions. This want will be severely felt if the war is protracted through another year. A million of men fighting for the maintenance of the Government makes a serious breach in the productive power of the country, which can only be supplied by the introduction of labor-saving machinery. Inventors are called upon to work out such improvements as will effectually meet all the wants of the country. It strikes us that this is a most favorable time to develop good inventions. The business of the Patent Office is progressing favorably, and everything is encouraging to the prompt exercise of the inventive faculty.

Improvements in Omnibusses Wanted.

The omnibus, as at present constructed, is very far from satisfying the public needs; and we call the attention of our inventors to the matter, in the hope that they will devise something better. The inconveniences are many, and not the least is the difficulty ladies experience in getting in and out without exposure of their crinoline; another is the windows, which in rainy weather, permit a stream of cold and muddy water to ooze gently down the passengers' back; when the windows are opened in front, several pairs of dirty boots dangle against the faces of the public, defiling the air, and creating feelings of intense disgust; in some of the one-horse cars the box is built across the front, thus obviating that nuisance; we do not see any objection to carrying the principle out more fully. The objections alluded to are but a few among many; the whole affair is odious, inconvenient, and ought to be the remnant of a forgotten age.

Wagon Wheels.

We have received a letter from Mr. O. N. Chapell, of Prattsburgh, N. Y., asking for information upon the subject of setting wagon wheels so as to make them run easily on their axles. Mr. Chapell is of opinion that much depends upon the "dish" of the wheel, the taper of the arm, &c., and would be glad of any information upon the subject. We can only refer him to Chinnock's Ball Axle, which is designed for the purpose specified. Perhaps some of our readers can inform Mr. Chapell in respect to the other details.

Solvent for Old Putty and Paint.—Soft soap mixed with solution of potash or caustic soda; or pearl ash and slaked lime mixed with sufficient water to form a paste. Either of these laid on with an old brush or rag, and left for some hours, will render it easily removable.

On Saturday, Oct. 18th, no less than 21,026 pedestrians, 531 equestrians, and 4,378 carriages entered the N. Y. Central Park; total nearly 40,000 visitors.

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VOL. VII. NO. 18.....[NEW SERIES.]....*Eighteenth Year.*

NEW YORK, SATURDAY, NOVEMBER 1, 1862.

THE MONEY MARKET.

We see that some of our cotemporaries attribute the present abundance of money, which is offered at the low rate of five per cent a year, to the great quantity of paper money which has been put in circulation by the Government, but we think, if the subject is thoroughly investigated, it will be found that there is no relation between the two.

Who are the money lenders? And how did they get their money?

Let us take an individual case. There is a gentleman well known to the note brokers of this city, who always has a few thousands to invest in notes that he believes will be paid, and the mode in which he obtained these thousands is perfectly plain to those who have watched his prosperous career. As it is a fair sample of the process by which most money lenders have obtained their capital, it will serve to illustrate the subject.

This man began life as a day laborer, and worked and saved until he had $175 in the savings bank. He then invested this amount in certain styles of dry goods which he had taken pains to become familiar with, and opened a small store in the lower part of the city. The goods he bought by the piece, and offered to sell by the yard. This labor of dividing the goods into quantities which individuals wanted, of standing always ready to measure and cut off the desired number of yards, and of wrapping up the parcels and sending them home, proved more valuable to the community than the labor which the man was performing before. We mean of more money value, and this was shown in the fact that the community were willing to pay and did pay more for this service than for the other. In other words, the man made money faster in his little dry goods trade than he did working at wages; and at the end of the first year he found himself worth $750.

To understand this matter, let us observe the facts. The $750 worth of capital is not money, but dry goods. The fact that these goods are property, is not owing to the circumstances that they will sell for money, but results from their power of satisfying some human want. It is this power which makes them exchangeable either for money, or flour, or labor, or other things which people regard as desirable.

At the end of the second year, our capitalist was worth $2,000, and from this time forward, by shrewdness, diligence and economy, his business increased, and his wealth accumulated, and just before the war he retired with a little over $300,000.

During all of the time, the principal portion of the property existed in the form of dry goods. Some of these goods were in his own store, and some were scattered through the country in the hands of those to whom he had sold them, and whose notes he held. In accumulating this property, the trader had not got money out of any other person; no man was impoverished by his becoming rich. The wealth that he accumulated was an addition to the wealth of the country and the wealth of the world. All of the wealth in the world has been accumulated by the savings of individuals. Had there been no savers, there would never have been any wealth accumulated. Among the natives of Ceylon and among the Digger Indians of California no wealth accumulates, because none of the inhabitants have the disposition and faculty to save it.

When our gentleman retired from trade, he decided to invest his property in notes, in other words to loan it on interest, and if we look into the matter, we shall find that it still exists in the form of dry goods and other merchandise. It is generally hired by business men, either manufacturers or traders, and they invest it at once in some form of property other than money. A small amount of money—about two per cent of the whole—is necessary to effect the exchanges, but the principal portion of the capital exists in the form of merchandise—and it is best for all parties and for the community that it should.

Nearly the whole of the capital that is offered to loan in Wall street and elsewhere has been accumulated in this slow way—by individuals saving a portion of their profits or incomes—producing more than they consumed. The supply is increased by the continuance of these savings. Our capitalist has more to loan at the end of each month than he had at the beginning, because he does not expend the whole of his interest money. But we cannot see how either he or any other capitalist has any more capital to loan in consequence of Secretary Chase paying out a great quantity of Treasury notes.

THE TAX UPON CASTINGS—INJUSTICE TO SMALL MACHINE SHOPS.

It is to be regretted, that so few mechanics and manufacturers are sent by our people to represent their interests in an intelligent manner in Congress. The tax bill affords abundant evidence, that it was prepared and passed by persons unacquainted with machinery and manufactures generally. Thus for example:—

Under date of October 9, Commissioner Boutwell writes to a gentleman in Baltimore:—"Your letter of the 2d inst., containing inquiries as to whether the tax under the excise law is laid both on castings and finished machinery, without reference to the fact as to whether the component parts of said machinery have been previously taxed as castings or not, is received. I am of the opinion that the view taken by the manufacturer is sustained by the law. Castings are liable to a tax of three per cent, unless otherwise provided. When sold by the manufacturer the tax must be assessed and paid. If afterward these castings are assessed as component parts of other articles, the latter (that is the articles) will be assessed without regard to the fact of previous payment."—*New York Times, October* 16.

By this decision it will be observed, that large machine shops and manufactories, which are provided with foundries, pay a single tax upon their products that are composed partly of cast and partly of wrought metal, while the small manufacturers of such articles pay a double tax on their castings. Thus there are many small machine shops, the proprietors of which purchase their iron and brass castings from separate foundries, then they fit up these castings, and combine them with other parts made of wrought iron and steel. Now as the castings which they purchase are taxed three per cent, and their finished composite work is assessed upon its whole value, of course their castings are taxed twice. On the other hand, a large establishment in which machinery is manufactured, and which has a foundry connected therewith, escapes the tax upon their castings that are employed in printing presses, steam engines, &c. Their castings are not taxed, as such, because not sold separately. This tax will enure entirely to the benefit of large machine establishments, and tend to the ruin of smaller ones. It also falls injuriously upon a great many other products besides machinery, and its injustice will be severely felt by several classes of our manufacturers.

STAMPING PATENTED ARTICLES.

A correspondent, referring to the paragraph on page 219, present volume of the SCIENTIFIC AMERICAN, wishes us to give further explanations touching the requirements of the law in regard to stamping the date of the patent on patented articles. He is the manufacturer of a small article made of cast iron. He states that it would be difficult to have the date of the patent cast thereon, owing to the trouble occasioned in drawing the pattern from the sand; nor would it be readily practicable to apply a die stamp for the blow would cause breakage. How can he conveniently comply with the law? We answer that he can use an inked stamp, having a soft surface; or he can apply a paper stamp pasting it upon the article. The object of the law is to give notice to the public, and especially to the purchaser, that the article is patented. The stamp, whatever the form in which it is applied, should be reasonably durable and legible. Where the article is so small or of such a nature that no stamp can be well applied to it, then the envelope in which the thing is put up must be stamped with the date of the patent.

TRIALS OF ENGLISH IRON-CLAD SHIPS.

We condense from the London *Artizan* some accounts of trial trips of armored vessels which have been recently made. It says:—

Saturday, August 30th, the day appointed for the trial of the *Black Prince* at full power, having been fine, the wind light off the land, and the water almost without a ripple, preparations were made for taking the ship to the trial-ground. In weighing anchor however, some delay took place in connection with the steam capstan, one of the rollers having given out. This being remedied, the ship reached the ground in time to complete the required six runs while the tide served. Since the previous partial trial, when she only realized a mean speed of 12.02 knots; she has been docked, had her bottom thoroughly cleansed and the safety valves weighed equal to those of the *Warrior*. Under these circumstances, as both the ships and their engines were made from one set of drawings and patterns, it might be reasonably expected that the speed of both vessels would be, as nearly as possible, equal. The actual results, however, proved definitely that the *Black Prince*, under present circumstances, is fully one knot an hour inferior to the *Warrior* in point of speed. The results of the first hour's trial (63 minutes) of the *Black Prince* was in speed 15.126 knots with steam at 21½ lbs., vacuum at 24 inches and screw revolutions at 54 per minute. Of the third hour (64 minutes, odd seconds) the speed was 14.694, steam 21½ lbs., vacuum 25 inches, revolutions 51½. Of the sixth hour (64 minutes, 30 seconds) the speed was 13.091, the steam was 21½ lbs., the vacuum 25 inches and the revolutions per minute 52; the mean speed of the six runs being set down at 13.317 knots. A comparison of the *Warrior's* trip would exhibit the following figures:—First hour (63 minutes odd) the speed was 16.514 knots, steam 21½ lbs., vacuum 24 inches, revolutions 55. Third hour (63 minutes) speed the same, vacuum and steam the same, and revolutions 54½. The sixth hour showed the speed to have fallen off to 12.543 knots per hour, while the gages exhibited the same pressures; the revolutions also falling to 53.50. Mean speed of the *Warrior* during six runs, 14.354 knots. By comparison it will be seen that there is a difference of speed against the *Black Prince* of 1.037 knots.

In seeking for the cause of this difference several reasons may be found, which, together or separate, will account for the apparent loss, although the *Warrior* will still be undeniably the fastest ship of the two. There is a difference in the pitch of the two screws of seven inches; with the *Black Prince* altered to this extent, it is calculated that she would increase her revolutions from her maximum of 52 to the maximum of the *Warrior's*, 54 or 55, which would give her an increase of speed. The *Black Prince* also drew 7½ inches more water on her trial than the *Warrior*; adding so much consequently to her displacement and resistance. It will also come within the recollection of our readers that she grounded and heeled over before leaving the Clyde, which is supposed to have strained her somewhat. If the form of her bottom is altered, here is sufficient cause to account for the loss of a knot an hour in speed; a selection of all these causes, however, can only be made of the 7½ inches extra displacement and the difference in the pitch of the two screws. The draught deserves attention; no reason can be assigned certainly, for the displacement of the *Black Prince* exceeding that of the *Warrior*, the former's auxiliary engines exceed in weight those of the latter, but the rifle tower alone would more than compensate for this; the bottom of the *Black Prince*, therefore, must be

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either sharper than the *Warrior's*, out of shape, or else her plates must be heavier; over so vast a surface the thirty-second part of an inch would make a great difference in weight. It is certain that the loss in speed is not occasioned by the working of the engines, as they fully maintained the reputation of their builders; the loss then is due to the ships' hull, and to find the exact reason whether it may be referred to the immersion or to the bottom, it would be necessary to lighten, trim, set her propeller at the same pitch and try her again under exactly the same circumstances (or as nearly as possible the same) as attended the *Warrior's* trip. With reference to speed under steam much ignorance prevails. If a ship is said to have made 14 knots per hour, this is supposed to indicate her future speed at sea; there never was a more fallacious supposition. From all speeds made at the measured mile 1½ knots may be deducted; the remainder giving the vessel's best speed at sea, with clean fires, good fuel and the ship in fact pushed to do her best. Taking the average at sea, two knots may be deducted from the measured rates; the reason is plain: at the measured mile she burns the best picked fuel, her fires are manned by picked men, and the trial is only made under the most favorable auspices. When the *Warrior* made her 14.354 knots at the measured mile, her average sea-speed was set down at 12½ knots per hour; this, when in good order, is her true rate. The *Black Prince* concluded her trials for the present with reduced boiler power on Monday, September 1st.; the first trial was made with six out of ten boilers, with a net result for the four trials as follows:—In speed 11.663 knots, with steam at 20 lbs. mean, turns at 44 mean, and vacuum at 26 inches. The *Warrior* on her trial on the 26th of October realized a speed of 11.040 knots with six boilers.

The *Black Prince* was tried subsequently with the suggested alterations in the screw; the expectations in regard to revolutions were met, but the speed of the vessel was the same. The average results, therefore, of the second trial of the *Black Prince* are thus summed up:—Mean speed 13.585 knots, indicated horse power 6,100; slip of the screw 14½ per cent, showing an excess of power over the *Warrior* of 540 horses, and also superiority in the number of revolutions.

The official trial of the *Resistance*—the fourth in commission, and sister to the *Defence*—took place in Stokes Bay on the 25th ult., by the measured mile, and was attended by the most satisfactory results. The vessel drew 23.9 inches forward and 26 feet aft, a little more than the *Defence* drew on her trial. A run was first made out to secure the anchor and clean fires; after this she was taken to the ground and tried with full boiler power. In running west the wind was on the port bow; on the return it was on the starboard quarter; the six runs were made with the appended results:—We give but three. The first hour (65 minutes) the speed was 12.080 knots, the steam was 20 lbs., the vacuum 24 inches and the turns were 67. Third hour (64 minutes), the speed was 12.721, the steam and vacuum the same, and the turns 68. Sixth hour (66 minutes) the speed was 10.256, steam and vacuum the same and revolutions 68 per minute. Mean speed of the six runs 11.832 knots per hour. These trials show a superiority in the *Resistance* over the *Defence* (both precisely the same in build, model and engines) at full power, of a quarter of a knot, and at half power of no less than 1.315 knots, the latter a very important gain. When the above trials were concluded the *Resistance* got up full steam and tested the ship in making circles to port and starboard with the following results:—With helm "hard-a-starboard" the rudder was hove over to an angle of 24½ degrees in 40 seconds with 3¾ turns of the wheel; the half circle made in 3 minutes 11 seconds, and the full circle completed in 6 minutes 19 seconds; the engine revolutions being 59½ per minute. With helm "hard-a-port," the rudder was hove over to an angle of 24¼ degrees full in 38 seconds with 3⅝ turns of the wheel—the half circle made in 3 minutes 17 seconds, and the full circle in 6 minutes 35 seconds; the revolutions being 59 per minute. The additional power required to exert the great force necessary to accomplish the results obtained is produced by the addition of a third wheel to the shaft of the ordinary two; the tiller is a massive piece of wrought iron standing out from the rudder-head and provided with a quadrant by which the angles are obtained. The *Artizan* further adds that "so long as rudder-heads, gudgeons, and pintles stand, this immense power may answer to get the rudder around;" this statement is virtually a confession of weakness. The temperatures in the engine-room were 91°, 96° and 96°; those in the fire-room 110°, 132° and 135°.

The *Resistance* is armed with two 110-pounder Armstrong pivots, two 25-pounder Armstrongs and two 32-pounder smooth-bores; besides a 12-pounder Armstrong field-piece and smooth-bores for boat service; on the main deck are six 95-cwt. guns, throwing 68-lb. shot and four 110-pounder Armstrongs, all on sliding carriages with directing bars.

NEW MODE OF PREPARING BLACK LEAD.

Carbon is one of the most wonderful substances in nature. The various forms, colors and properties of this material excite our wonder and command our admiration. In one form it is the coal which is employed for heating our houses and generating steam; in another condition it is the diamond—the most brilliant of gems, and in another state it is the black lead (also called graphite and plumbago) which forms our pencils, the polish for sheet and cast iron, the powder of the electrotyper and the crucible for the smelting of metals. It is a mystery to all men that the same substance in the form of charcoal is so inflammable, while in the condition of graphite it is so fractious that it can withstand the high heat of an iron smelting furnace without being fused. In the manufacture of coal gas a substance accumulates in thin scales on the inside of the retorts, which is nearly pure carbon and resembles black lead in lustre, but it is not used for any useful purpose. Graphite has usually been found in rounded masses deposited in veins in the primitive formations, particularly in gneiss, granite, mica-schist and primitive limestone. Some years since the best known natural depository of pencil graphite was the famous mine in Borrowdale, England. It is now exhausted. In all instances natural graphite contains some impurities in the form of oxides of iron and manganese. The purest specimens are obtained in Barreros, Brazil; they contain but very minute traces of iron. Artificial graphite may be formed by placing an excess of charcoal in contact with fused cast iron. A portion of the charcoal dissolves on the iron, but separates on cooling in the form of large and beautiful leaves. Very good graphite is obtained in many places in America. At Sturbridge, Mass., it is taken in masses from veins in gneiss, and it is also obtained at Fishkill Landing on the Hudson river; at Brandon, Vt., at Ticonderage; at Rossie, St. Lawrence county, N. Y.; in Buck's county, Pa., and other localities. At Taunton. Mass., the Sturbridge black lead is reduced to powder, pressed into cakes, and then cut out into forms and dimensions suitable for pencils, &c. In France black lead is mixed with clay and lampblack to form different qualities of pencils.

In the present International Exhibition in London there is a good display of graphite from the veins at Greenville, Canada East. The blocks vary from twelve to eighteen inches in thickness. On another page, containing an account of the chemical products in the Exhibition, allusion is made to the new mode of treating plumbago by Professor Brodie. This process deserves the attention of all chemists and metallurgists, as by this discovery chemically pure carbon seems to be obtained. According to Professor Brodie's mode of treating graphite, we have learned that the crude lumps are first pulverized, then boiled in hydrochloric acid to remove the iron and manganese, after which the powder is washed with water, dried and then mixed with heated dilute sulphuric acid and chlorate of potash. By this treatment a considerable quantity of oxygen gas is liberated and absorbed by the graphite, which is washed and dried and then submitted to a high heat when a remarkable change takes place. The oxygen in the graphite is suddenly evolved, and in doing so, it tears the particles of the mineral asunder and they swell up to thirty times their original volume. In principle this operation is akin to that of Claussens' mode of producing flax cotton by liberating carbonic acid in the pores of the flax and thus splitting the fibers. The disentegrated graphite is now shaken in a vessel with water, when the heaviest particles subside to the bottom, and the fine light particles remain suspended in the water, which is poured upon a filter and the powder secured. When dried it assumes the appearance of shrivelled black tea leaves devoid of luster. Upon being slightly pressed, however, these leaves are reduced to exceedingly fine powder, and the slightest friction communicates to it a brilliant luster.

By this peculiar process the most impure graphite may be rendered equal, if not superior, to that which is obtained in Brazil. And perhaps the useless graphite which is formed in the interior of gas retorts may, by treating it as has been described, be rendered applicable for most of the purposes that natural plumbago is employed.

SOLDIER MECHANICS.

Among the many national peculiarities developed by the war, not the least striking is the versatility of our soldier mechanics. But few corps of sappers and miners follow our army, the exigencies of the strife not having permitted their organization; their loss, however, has been scarcely felt, if we may judge by the brilliant mechanical feats performed by the rank and file, under the guidance of their officers. Streams have been spanned and men and their equipments passed over in an incredibly short time, as in the passage of the Chickahominy, when the army was before Richmond; the canal cut by Colonel Bissel around Island No. 10 is another remarkable instance of perseverance, energy and engineering skill in the face of extraordinary difficulties; railroads have been rebuilt, engines put in order, parts missing hunted up and replaced, and, in short, all the arteries of our internal transportation, which had been tapped by treason, were by loyal hands bound up anew, order and vitality infused, and the time tables and other details rendered as perfect as the prevalence of war permitted. Whatever other feelings we may cherish in respect to the conduct of the war, we can only revert to the performances of our mechanics with emotions of pride and sentiments of gratitude.

HOW TO BURN COAL.

At this season, when this important article of housekeeping is so costly, it would be well to practice the closest economy in its use. This is not, by any means, done; coal is either wasted in consumption or else thrown out in the ashes. Nearly all, or at any rate, the greater part of our ranges and stoves have four doors, two large ones opening on the grate, and two smaller ones for lessening the draft and putting in the fuel; now, when the fire is started in the morning, it should be built only in one end of the grate, the other being full of coal; by this means the amount of wood required (which has also increased in price) is much reduced, and the coal ignites more quickly, the fire soon spreading to the green fuel first applied. When the stove is not in use for any especial purpose, such as baking or roasting, rake the fire clean and fill the grate as full as it will hold, then close up the draft openings, oven and all, and throw the small doors wide open, the fuel is then slowly roasted away to ashes and a good, clear fire at all times readily obtained. By far too much fuel is thrown away in the ashes; buy a patent sifter and screen them, picking out all the refuse, white cinders, &c., and you will be astonished at the result, fully one-third of the ashes may be rescued from the pile and re-consumed. These hints should not be neglected; we have tried them and know their value.

THE POLITICIANS AND THE WAR.

In sight of our office-window, in the City Hall Park, is the recruiting tent of Captain Hogan, a brave fighting Irishman who commanded a battery in the seven days' battle in front of Richmond. We met the captain the other morning on his round of duty, and enquired how he got on with recruiting. "Badly" he replied, and assigned as a chief reason that the politicians of both parties were hindering enlistments for fear some of their followers might get off to the war before election. The captain says those miserable fellows would sell out St. Paul and all the apostles if they could only get into office.

It is a sad fact that the life-blood of the country is being bartered away through the machinations of these political cormorants. We were never in greater danger than now. The people must be vigilant or all is lost.

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OTHER EXPERIMENTS WITH GUNS AND ARMOR TARGETS.

Two weeks ago, we described, on page 249, experiments which had been made at Shoeburyness with the Horsfall 13-inch smooth-bore gun, and with a 12-pounder and a 70-pounder Whitworth rifled gun, and how that 4½-inch iron plates backed with 18 inches of teak, were smashed with solid shot and pierced with shells. We have now to record another set of experiments the results of which go to prove that the thickest plated armor frigate is almost as vulnerable to improved guns as wooden vessels are to common guns. The new experiments were conducted at the same place on the 25th of September last, with the same Horsfall gun and a Whitworth rifled 120-pounder, but instead of the short range of 200 yards as on the former occasion, the range was 800 yards for the 13-inch and 600 yards for the other. The target was 21 feet long, 15 feet in hight, had 4½-inch outside armor plates, 18 inches of teak behind, a lining of ⅝-inch iron plates, and a framing of massive angle irons set 18 inches apart. The 13-inch Horsfall gun was fired four times with solid spherical shot of 275 lbs. and charges of 75 lbs. of powder. Four of the shot struck. One, a ricochet, bounded from forty yards in front of the target, smashed through the armor plating, making a great hole. It shattered the teak inside and fractured the interior plating, but did not pass through. The upper corner of the target was struck by the other shot, several great pieces were smashed out of it and a huge fracture made.

With the Whitworth gun a solid hexagonal flat-fronted shot, 6 inches in diameter and 13½ inches long was fired first with 23 lbs. of powder at a range of 200 yards less than the 13-inch gun. The shot struck the target near the bulls-eye and at the point of concussion a bright sheet of flame was emitted, the shot passed clear through the armor into the wood, then struck one of the massive angle irons and shattered it to pieces, but it did not go entirely through the target, though it made a bad fracture in the inside plate. A shell 17 inches in length, and loaded with 3½ lbs. of powder was then fired with a charge of 25 lbs. of powder. This shell pierced through the armor plate and the teak backing, then exploded when it struck the inner plate, and tore the lining into fragments. The solid shot and the shell fired from this gun made clean 8-inch holes in the armor. Their velocity at the moment of impact was ascertained to be 1,284 feet per second.

With respect to the conclusions arrived at from these experiments, the London *Times* says: "For the last three months the experiments at Shoeburyness have virtually changed their whole character. They have ceased to be experiments on the resistance of iron plates, and have really, though not nominally, become efforts to discover what gun or what combinations of the best points of the guns, will pierce them. But the new frigates of the *Minotaur* class building at London and Birkenhead, are not to be partially covered like the *Warrior*, but completely cased from stem to stern with armor 5½-inch thick, instead of 4½-inch plates. We know, however, from past experience that a gun can be made to pierce any iron ships and the question now is, which is the best for this purpose. The Armstrong is out of the question." The *Times* asserts that the French navy rifled guns and the American cast iron Dahlgren guns "are useless against iron sides," and it gives the palm to the Whitworth gun and flat-fronted shot and shell.

EXPLOSION OF A SHELL—DEATH OF GENERAL CHARLES T. JAMES.

A sad and fatal accident occurred at Sag Harbor, L. I., on the morning of the 16th inst., during an experiment with explosive shells, by which H. Beverland was almost instantaneously killed, and General James, the inventor, so severely injured that he expired next morning. A large party had been invited to witness the firing with a 12-pounder and James's improved conical shells; when in the act of pulling off the cap from the plunger of one, by H. Beverland with a pair of nippers, a spark was generated by the friction, the charge was ignited and the shell exploded. Beverland was fearfully mangled, and so was the general who was standing at his side. Henry P. Byram, a well-known inventor, of Sag Harbor, was also severely injured; so were Captains Bergen and Smith, and several others who were standing near were slightly wounded.

General Charles T. James was born in the town of Greenwich, R. I., in 1804. For a number of years past he has occupied a conspicuous position before the public as a mechanic, engineer, manufacturer, politician and inventor. In early life he learned the trade of a carpenter and was distinguished for superior skill. He educated himself in engineering connected with the construction of cotton mills and their machinery, and was for some time superintendent of Slater's Mills in Providence. In 1838, he was elected Major General of the militia of Rhode Island, and thus received his military title. He built the Bartlett & James's Steam Mills of Newburyport, and was engineer of quite a number of mills in various States. His practical knowledge of cotton machinery is said to have been very minute. In his native State he acquired much influence, and was elected United States Senator for the full term in 1851, and while in that office he was for a period chairman of the Committee on Patents.

When our national conflict commenced, he devoted himself to the construction of destructive war missiles and invented the expanding, banded shot which bears his name, and by which, through the inadvertence of his attendant, his life was terminated so unexpectedly. General James was a man of commanding personal appearance and good address. His practical information was extensive, and the Providence *Journal* states that he was social, kind and charitable, and possessed the rare faculty of bending other wills to his own.

OUR CITY MARKETS.

One fact which has excited the greatest remark among all visitors, both native and foreign, is the state in which our depots of food are permitted to remain. Their condition is, not to mince matters, absolutely disgusting. Among civilized nations it is customary to regard all things appertaining to the sustenance of the human body as in a degree sacred. Meat, among the Jews at least, is slaughtered with peculiar observances, and cut with knives of a stipulated shape and length. Among our own people we are not aware of any particular care either in its preparation or sale, designed to make it more attractive, except such as is absolutely necessary to prevent it from being unsaleable. Possessing the reputation of being one of the first cities in point of social and commercial importance in the world, we yet allow the particular meats spoken of to remain in a condition which would be regarded as heathenish in Dahomey or Abyssinia; every thing is mixed up in the most sublime confusion, and we have not, if we except two small branches, one place in our city that can be properly called a market. Cheese and butter elbow beans and cabbage for room; beef and pork, and butcher's meat generally, dispute a narrow passage alternately filled with poultry, fruits, oysters or fish; how it is possible under these circumstances for wholesale buyers, such as are our hotel and boarding-house stewards, to go there day after day for their supplies without vexation of spirit we cannot imagine.

In the beef market alone of this city from five to six thousand head of cattle are weekly slaughtered to keep our citizens in good spirits through their trials; the mutton and lamb statistics received for the week ending Oct. 25th, show an aggregate of 14,529 head, and of pork 23,883; the vegetables which come in from the various railroads and steamboats are absolutely inestimable. If we consider also the butter, eggs, poultry and fish which are consumed, we shall have an amount of provision that requires a better disposition of it, to be made both economical and profitable to the buyer and seller. Under the present state of things we assert that this is not attained; the cost of living is greatly enhanced to our citizens, and consequently, by analogy, the profits are less to the seller than they would be if the markets were such in fact. Order is heaven's first law, and to follow it out is a great virtue. Why then can we not have each staple confined to its particular place, as is done in Tompkins and Essex markets? Why is not beef in an aisle by itself, or why are not all butcher's meats in their appropriate department? By what association, gastronomic or otherwise, do fowls and cheese affiliate? by what possible flight of fancy can we reconcile fish and grapes, or oysters and fruit of any sort? Yet in Fulton market these things can be seen daily, all in one grand chaos closely intermingled. Not very long ago a large portion of Washington market was destroyed by fire, and then we hoped would arise upon the ruins a fabric worthy of the place and name; but to-day the buyers and sellers wander through close, ill-smelling, filthy lanes, and the place remains as disgraceful as ever. Let us have better and more commodious *entrépots* of provision, and we shall be no more a by-word and reproach in this respect.

A TERRIBLE BOILER EXPLOSION.

On Tuesday morning, the 21st ult., one of the boilers in the Tewksbury Alms-house, Massachusetts, exploded with a terrible effect. The boiler room—a brick building at the east end of the main structure—was terribly shattered. Six persons were killed and nineteen were wounded; some narrow escapes are recorded, among others that of Capt. Marsh, who had passed the spot but a few minutes previous, also that of a man who was in the engine room west of the boiler, who escaped with a stunning. The cause of the terrible accident is stated by the Lowell *Journal*, from which we copy the account, to be a "mystery;" the engineers affirming that the boilers were in a good condition, and had on a low pressure.

[It would be unjust at this distance to criticise the above report, but it is a little singular that out of a large per cent of boiler explosions, the greater part have either just been repaired, or else, some one had tried the water but a few minutes before the accident occurred and found plenty of it. We commend to the attention of the jury and others the investigations on the subject of boiler explosions published in this paper for the 18th of October.—Eds.

A Confederate Ram building in England.

Besides the commissions committed to other shipbuilders by the Southern Confederacy, and which are being pushed forward with all possible dispatch, a large iron-plated ram is now being constructed on the Mersey, without much attempt at concealment. We withhold the name of the builder for prudential reasons; but the fact is without question, and the ram, from the high character of her builder, will be a most formidable opponent when equipped for sea; and, and should the blockade of the Southern coast not terminate before her arrival before Charleston, she will attempt to pass the Federal cruisers with every chance of impunity. In addition to this ram, and other contracts held by our shipbuilders—which, by the way, are highly flattering to their reputation, and which hitherto have been financially discharged in each instance (when completed) with scrupulous punctuality—a vessel, now in the Brunswick Dock, the name of which we do not wish to give for obvious reasons, has a cargo consisting principally of iron plates on board, ready to fasten on the sides of Southern vessels waiting their arrival out at Charleston. The owners of this vessel are imbued with Southern sentiments; but, whether or not, we are too neutral in the gigantic conflict raging across the Atlantic to allude too pointedly to this transaction. Of one thing, however, we think we can speak with certainty, and that is, that in the vessels built on the Mersey the South will have an advantage over the Federals in strength of build, equipment, and invulnerability. The rest their own courage will do, and we may yet hear of the gallant performance of more than one "No. 290" before the announcement of peace gladdens the heart of all Europe. At all events, a few such rams as the one now building on the Mersey would make the raising of the Southern blockade an easy task.—*Liverpool Daily Post.*

[The Liverpool *Daily Post* no doubt knows all about this matter, and, in common with a great majority of its countrymen, nothing would please it more than to see the legitimate Government of the United States overthrown by armed treason and rebellion. It is utterly amazing to us that a great Christian people like the English should so stultify themselves in relation to this great crisis in our country's history.—Eds.

The steamer *Persia* had 1,900 bales of hops as cargo when she sailed hence on the 22d ult., for Liverpool.

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THE PASSAIC—A FORMIDABLE VESSEL.

This extraordinary vessel, the second of the *Monitor* class launched, is rapidly approaching completion—in fact, is so near it that we are informed her trial trip will take place in a few days. Workmen swarm in every part, so much so as to almost incommode each other. The armor, turret, and plan of ship are familiar to all our readers, having been described in previous numbers of this paper; the gun ports are drilled in the battery, or turret, and the weapons themselves look solemly through and forbid any attempt at familiarity; indeed the appearance of these monstrous cannon—one of 15-inches bore, and the other of eleven, and weighing respectively 42,020 lbs. and 15,000 lbs—would, on superficial examination, seem to be sufficiently appalling to the enemy if he could examine them, without the argument of the 560 lbs. of iron which the largest one throws. The other defences, combined with the ordnance, will make the *Passaic* the most formidable vessel now afloat, with the exception of the unfinished *Roanoke*. The decks are nearly all plated with the one-inch covering, and only a few details remain to be finished. Descending to the interior of the vessel, we find the steam machinery all completed and ready for use, the peculiarity of its appearance would impress the beholder at a glance. No attempt has been made at useless ornamentation, or gew-gaws, as is too often the case, they are simply clean, neat and tasty, easily accessible and apparently readily controlled. We think a description will interest our readers. A steam cylinder resting on its appropriate plate, is divided in the center by a partition, unbroken we suppose, except by the necessary hole for the boring bar, afterward closed with a bonnet; from either end of this cylinder issues a small trunk, to the bottom of which is attached a rod connecting with a rocking shaft and lever running across the engine front; directly from this shaft the screw is driven by means of an arm, and the ordinary connecting rod. The arrangement is as simple and free from detail as anything could be, and has this advantage to those who like to keep clean about machinery, that they are easily managed and open to view in every working part; the air pumps are independent from the main engine and also in plain sight; the valve gear is of the slide variety, worked by eccentrics in the ordinary manner, except that these are not upon the main shaft, but upon a counter shaft directly in line with the former and from which they are worked by an offset arm. An ingenious method of reversing looked so tempting that we almost forgot that cardinal virtue about machinery, "touch not, handle not," and came near backing the *Passaic* out of the dock. The boilers are of the usual navy pattern, so far as we could discover from a cursory examination; so many mechanics were about that we felt a conscientious hesitation in interfering with their patriotic labors. The other and finer details of the ship and machinery we shall give more at length upon the occasion of the official trial. We would add, however, that the machinery and fixtures bear the unmistakable impress of Mr. Ericcson's genius.

RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Car Truck.—The object of this invention is to economize in the application of steel springs to car trucks and at the same time obtain a truck that will have greater elasticity than the ordinary ones and be capable of running easier or smoother over the track, and the shoe bars at the same time be allowed to yield readily to the action of the brake mechanism. The invention consists in a novel construction of the car truck, whereby two springs are made to answer for the truck instead of four hitherto used. The invention also consists in a novel way of suspending the shoe bars to the truck, whereby the former may be readily attached to and detached from the latter. The inventor of this improvement is Peter Lamb, of Cincinnati, Ohio.

Stump Extractor.—This invention is an improvement in machines for pulling up stumps of trees, &c., where, in the offset, the power required to extract them is very great, but it gradually decreases as the stump is loosened, requiring much less power at the latter part of the operation than at first. The invention consists in constructing a machine, formed of two truncated cones, spirally grooved, attached to shafts that give motion to a bevel gear wheel, on the shaft of which is a cone pulley with a spiral groove in its surface, the whole constructed so as to gradually increase in speed as the stump is extracted and so that the team will travel the shortest possible distance. Freeman Godfrey, of Grand Rapids, Mich., is the inventor of this improvement.

Grain Separator.—This invention relates, first, to an improved means for preventing the hopper from choking or clogging, and consists in the employment of a reciprocating slide placed at one side of the hopper and arranged to operate in connection with the upper shoe of the machine. Second, to two separate shoes placed within the case of the machine in reverse inclined positions, one shoe being provided with wire sieves and the other with perforated sheet-metal screens, whereby the grain may be properly separated from all foreign substances, and oats separated from wheat. Charles Kathan, of Hardin, Iowa, is the inventor of this device.

Watch and Chronometer Escapement.—The object of this invention is to dispense with the extremely delcate springs used in the kind of escapement known as the chronometer escapement, commonly used in chronometers, and to obtain an escapement in which all the advantages of the ordinary chronometer escapement are retained, but which is no more liable to get out of order than a lever escapement, and which is of such simple construction and adjustment that any watchmaker of ordinary skill can make and apply it; to this end it consists in substituting for the springs ordinarily used, an arm and pallet of repose, combined and applied so as to be acted upon by a simple spring not requiring to be of any exact length. This device is the invention of Robert Barclay, of Buffalo, N. Y.

Stamp Tax—Important to Inventors.

[Copy.]

TREASURY DEPARTMENT,
Office of Internal Revenue, Oct. 16, 1862.

SIR:—In reply to your letter, I have to state:—

First, that a power-of-attorney to prosecute an application for a patent, or to transact other business before the Commissioner of Patents, comes within the meaning of the fourth clause of the Excise Law, relating to "Power-of-Attorney," and is therefore subject to the dollar stamp.

Second, that, in my opinion, the assignment of an invention or patent right must be regarded as an agreement, and must be stamped accordingly.

Third, that every paper is equally valid, issued before January 1st, 1863, without a stamp as with it. If the unstamped instrument should be needed as evidence in court, the party using it would be subjected to an expense of five dollars in addition to the cost of the stamp required. Congress will probably give relief in this particular. Very respectfully,

GEO. S. BOUTWELL, Commissioner.

SEVENTEEN THOUSAND PATENTS SECURED THROUGH OUR AGENCY.

The publishers of this paper have been engaged in procuring patents for the past seventeen years, during which time they have acted as Attorneys for more than SEVENTEEN THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address

MUNN & Co.,
No. 37 Park Row, New York.

LARGE METEOR.—On the morning of the 18th inst., at five o'clock and four minutes, we observed a large meteor. Its path, as near as we could discover with eyes still dimmed by sleep, was from west to east, and its passage extremely rapid. The nucleus was quite large and the general appearance of the celestial eccentricity was very brilliant.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING OCTOBER 14, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

36,634.—L. A. Aspinwall, of Ireland's Corners, N. Y., for Improvement in Machines for Planting Potatoes:

I claim, first, The box or magazine to contain the seed potatoes, having a hollow, cylindrical revolving bottom, with openings in its upper and lower plates for the passage of the potatoes down into the ground; the openings in the upper plate being provided with a gage to regulate their size, also with trap doors operating automatically, to protect the potatoes from injury, and regulate their passage through the hollow bottom, substantially as described in this specification.

Second, The combination of the box or magazine, so constructed and fitted as described, with the gearing for revolving the bottom, and with the plow and scraper, substantially as set forth in this specification.

36,635.—A. B. Bailey, of Middle Haddam, Conn., for Improvement in Caps for Coffin Screws:

I claim the flat ear or lug, d, of the cap, B, in combination with the slitted prominence, h, on the base, A, when arranged as shown, to form a new and improved catch or fastening for an ornamental cap for coffin screws, as herein set forth.

[This invention relates to an improvement in the ornamental caps which cover the screws of coffins, and consists in a novel and improved way of securing the cap to its base over the head of the screw, whereby the cap is prevented from being casually released and sliding off from over the head of the screw so as to expose the same, the invention also insuring a snug or proper fit of the cap to its base.]

36,636.—Zachariah Baker, of Erie, Ill., for Improvement in Tanning:

I claim the use of the oats and barley chopped (unbolted), in connection with the salt for a bath, as combined and in the proportions set forth in my specification, and also the use for a tanning compound composed of the smart weed, may weed, oxalic acid, kino, catechu, potash and red sanders, as combined and in the proportions substantially as set forth and mentioned in my specification.

36,637.—Robert Barclay, of Buffalo, N. Y., for Improvement in Chronometer Escapements:

I claim the arm, h, made with a toe, i, the pallet of repose, e, and the spring, j, the whole applied in combination with each other and with the escape wheel and lifting pallet, substantially as and for the purpose herein specified.

36,638.—A. M. Beebe, of West Bloomfield, N. Y., for Improvement in Whiffletrees:

I claim the combination and arrangement of the equalizing eveners, A B and D, with the whiffletrees, a b and d, for three-horse teams, substantially in the manner specified.

36,639.—William Bickel, of Pottsville, Pa., for Improvement in Stoves:

I claim the employment or use of an air chest, D, placed centrally in the fire place of a stove or furnace, communicating with the ash box thereof, and provided with horizontal tubes, F, in combination with tubes, G, attached to the sides of the body of the stove or furnace, and communicating with the external air, substantially as and for the purpose herein set forth.

I also claim the valve, I, placed within the air chest, D, and the covers or slides, H, applied to the outer ends of the tubes, G, for the purpose of regulating the admission of air into the fire-box as specified.

I further claim the triangular form of the tubes, F G, and the inclined ends, when used as and for the purpose herein set forth.

[The object of this invention is to facilitate the burning of very fine coal in stoves and furnaces, and consists in introducing air into the body of coal in the fire-box in such a manner as to insure a circulation of air through the entire mass, and the perfect combustion of the whole.]

36,640.—L. G. Bradford, of Plymouth, Mass., for Improved Apparatus for Leathering Tacks:

I claim, first, The application and use of the horizontal reciprocating separator, D, for taking the tacks singly from the foot of the inclined guide plane, and carrying them to the receiving dies or other receptacle for holding the tacks during the process of being driven through the leather or other material.

Second, The combination with the reciprocating separator of the self-acting latch, b, for throwing or removing the tack from the notch, a, or its equivalent.

36,641.—Lazare Cantel, of New York City, for Improved Canteen:

I claim the lining of metal to the leather canteen, applied substantially as specified.

36,642.—Joseph Chase, of Lowell, Mass., for Improvement in Machines for Cutting Flocks:

I claim the plate, I, placed within the cylinder, A, and arranged relatively with the knife cylinder, D, to operate as and for the purpose herein set forth.

[This invention relates to an improvement in the ordinary flock-cutting machine which is in most general use, the same consisting of a rotating hollow cylinder, provided with ribs on its inner periphery, and a rotating cylinder of spiral knives placed within the cylinder and arranged with a stationary knife, over the edge of which the edges of the spiral knives pass and perform the cutting operation.]

36,643.—J. E. Culver, of Hudson, N. J., for Improvement in Steam-Generating Apparatus:

I claim, first, The combination within the boiler of a furnace, B, a system of submerged flues, E E, and one or more reticulated diaphragms, d, substantially as herein specified.

Second, The furnace, B, constructed with internal fire-box, C, grate, D, diaphragm, M, air inlet, a, passages, f f, chamber, g, and outlet, F, the whole arranged substantially as and for the purpose herein specified.

Third, The combination of the boiler, A, furnace, B, fire-box, C, grate, D, diaphragm, M, air inlet, a, passages, f f, chamber, g, outlet, F F, and flues, E E, the whole constructed and arranged to operate substantially as herein specified.

[This invention relates to that class of steam-generating apparatuses in which the gaseous products of the combustion of the fuel are allowed or caused to mingle with steam generated by heat transmitted from them to the water, and used in combination with such steam, as a further source of motive power. The principal object of the invention is to obtain a combination of the steam and gaseous products of combustion at as low a temperature as is possible, and thereby not only to obviate the difficulties attendant upon the use of steam and gases at a high temperature, but to generate the greatest quantity of steam attainable from the combustion of a given quantity of fuel; and the in-

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vention consists in a certain construction of the generating apparatus, and certain improvements in some of the details thereof to effect that result.]

36,644.—Jacob Delong, of Covert, N. Y., for Improvement in Harrows:

I claim the bars, a a′, arranged or disposed so as to cross each other at right angles, in combination with the teeth, C, and sockets, D E, the teeth passing through the sockets and bars, and the sockets adjusted to the bars and made to clamp the same by means of the screws or bolts, d, which fit in the angles of the bars, substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a jointed or flexible harrow of simple construction, and which will be strong and durable, with its teeth well braced and so arranged or fitted in or to the harrow as not only to be permanently secured in position, but also made to serve as a means to firmly connect the framing of the harrow together, or keep the parts thereof in a proper relative position with each other.]

36,645.—H. H. Elwell, of South Norwalk, Conn., for Improvement in Locks:

I claim having the bevels, a a′, arranged one above the other upon the bolt, B, so that the inclined surface of each bevel will extend entirely across the face of the bolt, all as set forth.

[This invention relates to an improved lock of that class designed to be applied to doors that open either to the right or left, that is to say, capable of being so adjusted as to be applied either to a right or left hand door. The invention consists in having the latch or catch bolt of the lock provided with two bevels at its end, one bevel being in a reverse position to that of the other, or by having two separate latch or catch bolts provided with reverse bevels, in connection with a strike or nosing, provided with two slots or openings, all being arranged in such a manner as to admit of the application of the lock to the door without the adjustment, in any case, of any of its internal parts]

36,646.—Samuel Fretz, of Buckeye, Ohio, for Improved Hand Seed-Dropping Device:

I claim the combination of the slide, C, lever, D, seed slide, E, and spring, F, all arranged and applied to the box, A, provided with the cut-off, a′, to operate as and for the purpose herein set forth.

[The object of this invention is to obtain a hand seed-dropping device of simple construction, which will admit of corn and other seed being dropped very expeditiously and accurately by a very simple manipulation.]

36,647.—William Gilfillan, of Syracuse, N. Y., for Improvement in Devices for Closing Gates:

I claim the employment of the double cam, F G, for the purpose of graduating the force applied to the door, constructed and arranged substantially as set forth.

36,648.—Freeman Godfrey, of Grand Rapids, Mich., for Improvement in Stump Extractors:

I claim the spirally-grooved truncated cone, C, provided with a journal bearing at each end, and having rigidly secured upon it at one end a bevel gear wheel, D, in combination with the bevel pinions, a a, shafts, E E, and fusees or spirally-grooved wheels, G G, when arranged to operate in the manner and for the purpose specified.

36,649.—Peter Hayden, of Pittsburgh, Pa., for Improvement in Lamps:

I claim a wire clasp extending about two-thirds around the chimney ring, shaped and operating as described.

[This invention consists in the application of a spring clasp to the lamp top, for the purpose of securing the glass chimney in a proper position thereon.]

36,650.—R. P. Henry, of Akron, Ohio, for Improved Machine for Scouring Marble and Free Stone:

I claim, first, Constructing a machine for scouring marble and free stone, with a vessel for holding water, in combination with a central vessel for holding sand, substantially as and for the purposes described.

Second, The use and employment of a funnel-shaped vessel, fitted to the eye of the machine, and opening into it, for holding dry sand and delivering it upon the stone, substantially as set forth.

Third, The combination with the central sand receptacle of the convex distributor, C.

Fourth, The combination of the curved grooves, D, with the central eye, C, substantially as set forth.

36,651.—A. P. Hopkins, of Bentleysville, Pa., for Improved Fence for Sheep Folds:

I claim constructing fences with posts, A, and trap irons, c, substantially in the manner and for the purpose set forth.

36,652.—John Jacobs, of Columbus, Ohio, for Holder for Pens, Pencils, &c.

I claim a tubular pen-holder, adapted to receive the human finger into or through it, and a writing pen, pencil, or brush upon its outer surface, and to maintain its place upon the finger, and to support and confine the pen, pencil, or brush in position during the operation of writing, marking or coloring, substantially as set forth.

36,653.—Charles Kathan, of Hardin, Iowa, for Improvement in Grain Separators:

I claim, first, The slide, D, placed underneath the fixed side, b, of the hopper, C, arranged and operated substantially as shown, for the purpose herein specified.

Second, The two shoes, I′ ., provided respectively, one with the sieve, I, and the other with the screen, L, and sieve, M, and connected together so as to be operated simultaneously by the same mechanism, in combination with the fan, B, and adjustable board, T, all arranged as and for the purpose herein set forth.

36,654.—I. A. Ketcham, of Brooklyn, N. Y., for Improved Apparatus for Operating Submarine Batteries:

I claim, first, Advancing a submarine battery and adjusting it to any suitable position to be exploded by means of a sliding rod, C, substantially as and for the purposes described.

Second, Passing the rod, C, through a universal joint, substantially as described, to enable its adjustment to any position desired and relieve the battery and rod from any effect by the rocking or rolling of the vessel.

Third, The casing, A, and sliding gate, B, employed in the manner explained to constitute a closable water-tight compartment for the reception and attachment of the battery.

[By means of this invention an explosive shell or battery may be projected from the side, bow or stern of a vessel in any direction or position under the surface of the water, and exploded while it is held, or after it has been left beneath an enemy's vessel or any other object which it is desired to destroy.]

36,655.—J. W. Koehler and Fredk. Richards, of Decatur, Ill., for Improvement in Wind Wheels:

I claim, first, The cap or shield, D, when applied to and used in combination with a horizontal wind wheel, C, substantially as and for the purpose herein set forth.

Second, The horizontal circular or annular platform, H, applied to the framing, A′, in combination with the pendent bar, G, and rods, e e, arranged as shown, for the purpose of adjusting the cap or shield and retaining it relatively with the wind and the exposed buckets of the wheel, C, to regulate the speed thereof, as described.

Third, The hinged or adjustable vane, F, in combination with the rotating and adjustable cap or shield, D, and wheel, C, as and for the purpose specified.

[This invention consists in the application of a cap or shield to a wind wheel arranged in such a manner that only a portion of the wheel is exposed to the action of the wind, and the latter allowed to act upon or against the former in the most formidable manner for the driving of machinery, the invention at the same time admitting of the speed of the wheel being regulated as desired irrespective of the velocity of the wind.]

36,656.—L. J. Knowles, of Warren, Wass., for Improved Apparatus for Operating Valves of Steam Engines:

claim operating the slide valve, H, by means of a piston, I, or its equivalent, which is just brought into a proper position to take steam, substantially as described, by a partial rotary motion derived from the engine, and which is then driven by the steam independently of the engine, substantially in the manner described.

I also claim the employment of oblique openings or ports, h h′, in combination with the piston, I, and the steam passages of its cylinder, substantially as and for the purposes set forth.

36,657.—Peter Lamb, of Cincinnati, Ohio, for Improvement in Car Trucks:

I claim, first, Constructing the car truck of two parts connected together by springs, D D, arranged substantially as herein described.

Second, Attaching the springs, D D, to bars, C, which are connected at their ends by links, B, to rods, d, which pass through pendents, b, and have nuts, e, on them, for the purpose of regulating the tension of the springs, as set forth.

Third, Securing the links, I, to the shoe bars, H, and cross bars, i, of the truck, by means of the sockets, J, provided with recesses, k, and slides, l, arranged as herein described.

36,658.—J. S. Lash, of Carlisle, Pa., for Improved Washing Wringing Machine:

I claim the gate or movable frame, G, the pitman, O, the lever, R, the roller, S, the rubber, C, the springs, d d, the grooves, f f, and the rollers, g g, the whole arranged in the manner and for the purpose herein fully set forth and described.

36,659.—William Jones, of Rochester, N. Y., for Improvement in Coal-sifters:

I claim tightening the joints between the drawers, B and T, and the case, A, for the purpose of preventing the escape of dust or ashes from the apparatus during the process of sifting, by means of the adjusting bars, E, which are constructed and arranged substantially in the manner specified, and operated by the set screws, D.

36,660.—A. E. Lyman, of Williamsburgh, Mass., for Improvement in Ventilating Coffins:

I claim the indicating ventilator, as herein described and substantially set forth.

I also claim, as my invention, the combination and application and arrangement of the aforesaid apparatus and mode of applying the same for purposes as above described and substantially as set forth.

36,661.—W. W. Marsh, of St. Louis, Mo., for Improved Device for Raising Water by Steam:

I claim the combination of the cone, b, with the pipes, C A D, in the manner and for the purpose herein shown and described.

[An engraving and a full description of this invention will be published in our columns next week.]

36,662.—W. L. McDowell, of Philadelphia, Pa., for Improvement in Grates for Stoves:

I claim the combination of a draw bar with a vibrative grate so that it shall form a moving part of the same and operate substantially as described, for the purpose specified.

36,663.—Samuel McElrcy, of Brooklyn, N. Y., for Improvement in Hydrants:

I claim the combination and arrangement of the vertical hydrant tube, A, adapted to any form of head, having a base, A′, chambered to take the valve motion described, with the valve-seat hub, B, and with the internal, movable valve shaft and valve, c c1 c2 c3, operated externally, substantially as described.

36,664.—James McIntyre, of New York City, for Improvement in Compound Explosive Shells:

I claim the grenades, a a, introduced between the heads, b b, and fitted so as to be rotated upon the shaft or axis, c, within the bomb shell, d, as and for the purposes specified.

36,665.—J. R. Mills, of Bloomfield, Iowa, for Improvement in Pumps:

I claim the valve, j, partition, a, bridge tree or lever, J, projection, m, and rod, k, when combined and arranged to operate in the manner and for the purpose specified, and in combination with the above the piston packing, constructed and operating substantially as described.

[This invention relates to that class of pumps which are known as lifting pumps, and which are used principally for raising water from wells, cisterns, &c., and consists, first, in a device for returning the water remaining in the discharge pipe after every operation of the pump, into the well or cistern, and thus prevent its freezing up and obstructing the pump in cold weather ; and, secondly, in an arrangement for packing the pistons by the weight of the superincumbent water.]

36,666.—J. O. Montignani, of Albany, N. Y., for Improved Clothes-hanging Apparatus:

I claim a frame having between its bars pins for suspending garments, or other articles to fold, within the range of the bars, constructed and arranged substantially as described, and for the purposes set forth in the within specification.

36,667.—T. H. Murphy, of New Orleans, La., for Improvement in Hemp Brakes:

I claim the combination of the reversible aprons, d, with two sets of rotary brakers, i, flexible workers, o, and feed rollers, a a′, all constructed, arranged and operating substantially in the manner set forth, so as to operate upon opposite ends of the stalks without reversing their position.

36,668.—J. O. Norton, of Wilton, Ill., for Improvement in Harvesters for Broom Corn:

I claim, first, The combination of the horizontal main frame, a, driving wheel, c, vertical frame, f, and rear support, y z, constructed and arranged as and for the purpose set forth.

Second, The combination of the cutters, i, gatherers, j, shields, k, and discharging boxes, s, when arranged to operate substantially as and for the purpose explained.

Third, The self-opening shutter, t, connecting rod, v, and foot lever, w, when used in the manner described to control the discharge of corn from the inclined boxes, s s.

36,669.—John Pettengill, of Carrol, N. H., for Improvement in Machines for Digging Potatoes:

I claim the horizontal beak or nose, b, an inclined plane or grid, c, the endless grid, D, and the wheel, F, on the same, the deflector, H, and knives, I I, arranged and combined together, substantially in manner and so as to operate as and for the purpose specified.

36,670.—W. M. Randall and G. C. Howard, of Belleville, Ohio, for Bottom for Type Cases:

I claim the application to the case, A, of the bottom, B, arranged with blocks, c c, so as to fill each box, N N, in the case, A, as described, with the springs, D, and springs, E, and ratchet bars, F, to operate as set forth, whereby the case may be elevated or depressed, as the convenience of the operator may require, all to be used in combination for the purposes above named,

36,671.—S. H. Richardson, of Cleveland, Ohio, for Improvement in Stump Pullers:

I claim the herein described arrangement of the bed pieces, A A′ A″, in combination with the pivoted fulcrum, D, lever, C, windlass, H, pulley, K K′ and m, and rope, L, all operating as and for the purpose set forth.

36,672.—J. S. Rowell and M. F. Lowth, of Beaver Dam, Wis., for Improvement in Seeding Machines:

I claim, first, the triangular openings, d, and groove, e, in the cap, I, in combination with the seed cylinders, H, when arranged to operate in the manner and for the purpose specified.

Second, The combination of the forked or friction brace, M, with the pivot, ½, for connecting the shanks, K, and consequently cultivator teeth, J, to their drag bars, L, substantially as described.

[This invention consists in a peculiar construction of caps covering the seed cylinders, whereby the danger, which has hitherto existed, of seed being crushed in passing from the hopper into the conveying tubes is entirely obviated. It also consists in the employment of a forked brace in connecting the shank or standard of the cultivator tooth to its drag bar, for the purpose of allowing the tooth so connected to yield and thus prevent its being broken or bent or otherwise injured, when brought in contact with any obstruction to large for it to remove without danger of producing the result before mentioned.]

36,673.—S. W. Ruggles, of Fitchburg, Mass., for Improvement in Stump Extractors:

I claim the combination of the sheave, K, strut, M, and rope or chain, J, with geared drums of unequal diameters, C D, substantially in the manner herein shown and described.

[This invention is based on the principle of the differential or Chinese crane, and it consists in the arrangement of two shafts or drums of unequal diameter, geared together by cog wheels, in combination with a rope or chain extending from said shafts round the sheave of a block, and with a strut or derrick from the taper of which said block is suspended, and from which a hook or chain, or other suitable device extends to the stump or other article to be extracted or raised, in such a manner that by imparting a rotary motion to the two shafts or drums, the rope or chain unwinds on one while it winds up on the other, and a considerably increased or multiplied strain can be exerted on the strut or derrick, and, through its action, on the stump or other article to be extracted or raised.]

36,674.—Gelston Sanford and J. E. Mallory, of New York City, for Improvemeut in Machinery for Braking and Cleaning Flax and Hemp:

We claim the combination of a grooved surface, or the equivalent thereof, with a series of chains, or the equivalent thereof, having a mode of operation substantially such as herein described, and for the purpose set forth.

36,675.—Gelston Sanford, J. E. Mallory and C. P. Hayes, of New York City, for Improvement in Machines for Breaking Flax, Hemp, &c.:

We claim giving to one or more of the fluted braking rollers a vibrating or beating motion, in combination with the rotary motion, substantially as and for the purpose specified.

And we also claim, in combination with the braking rollers or their equivalents, giving a vibrating or shaking motion to the pervious apron, substantially as and for the purpose specified.

36,676.—John Simpson and Wm. Hayden, of Tecumseh, Mich., for Improvement in Grain Cleaners:

We claim, first, The cone below the saucer by which the separation of the grain is secured and its even delivery at the moment of its being acted upon by the current of wind, exposing the largest surface both of the grain and impurities to the action of the current of wind.

Second, The combination of the several parts, as above described, in the manner and for the purpose indicated, in connection with the curb spindle and stones of an ordinary flouring mill, as well as attached to other machinery like an ordinary smutter.

Third, The double surface scourer indented from the opposite surface.

36,677.—W. D. Sloan, of New York City, for Improvement in Hoop Skirts:

I claim combining corrugated wire, suitably wrapped and formed into hoops, substantially as described, with cords, straps or other equivalent means for connecting and holding the hoops, for the purpose set forth.

36,678.—F. M. Strong and Thomas Ross, of Brandon, Vt., for Improvement in Platform Scales:

We claim in the construction of "drop lever scales," the use of the auxiliary levers, D D′ D′, in combination with the rock-shaft, K, connecting rods, E E, and links, h h, or their equivalents, the whole operating substantially in the manner described and for the purpose specified.

We also claim the use of the shields or washers, b, provided with angular ridges or projections, c, in combination with the knife edges, a, and loops, d, as set forth.

36,679.—George Tainter, of Watertown, Mass., for Improvement in Dampers:

I claim the combination of the conical damper, D, and register, C, when fitted within a drum, B, larger in diameter than the pipe or flue, A, substantially as set forth.

[This invention relates to an improvement on a ventilating damper for which Letters Patent were granted to this inventor, bearing date May 13, 1862.]

36,680.—Albert Taplin, of Providence, R. I., for Improvement in Lamps:

First, I claim the attachment of a spring to the cone or chimney holder, to secure the chimney to the same, when the chimney-holder, cone and chimney are removed from the cap for trimming and lighting the lamp, substantially as and for the purpose herein described.

Second, I claim in lamps having the cone or chimney-holder connected to the lamp cap by a hinge, making that part of the hinge attached to the chimney-holder of the same piece of metal with the holder, and that part of the hinge attached to the lamp cap of the same piece of metal with the cap, substantially as described and for the purpose set forth.

36,681.—William Terry, of Birmingham, England, for Improvement in Breech-Loading Firearms. Patented in England, April 7, 1856:

I claim the mechanical construction and arrangement of the various parts marked, D E e E′ G f H H′ I K M N O and P, herein before particularly described, set forth and represented by the illustrative sheet of drawings hereunto annexed, together with the mode of operating with the same, for the purpose of introducing the cartridge into the barrel of the firearm, and for presenting a substantial and efficient abutment for the powder to act against, for discharging the contents of the barrel from the mouth of the firearm, as above stated.

36,682.—W. O. Thomas and A. M. Miller, of Fond du Lac, Wis., for Improvement in Journal Boxes:

We claim, a new article of manufacture, consisting of a journal bo composed of limestone and metal, as herein specified.

36,683.—Theophilus Van Kaunel, of Chester, Ill., for Improved Machine for Stoning Cherries:

I claim, first, The gravitating feeding device, D, substantially as and for the purpose described.

Second, The vertically sliding receiver or concave, E f g, with a central passage, h, through it, in combination with a series of barbed needles, m, and with the gravitating feeder, D, substantially as and for the purposes described.

Third, The pivoted spring finger-piece, applied and operating substantially as described for the purpose set forth.

Fourth, The organization of the machine as described, so that it will feed the cherries separately, stone them separately, and discharge the stone in one direction, and the cherry meat or pulp in another direction, substantially as and for the purposes set forth.

36,684.—D. C. Wilson, of Painesville, Ohio, for Improvement in Tailors' Press-Board Holders:

I claim, as a new article of manufacture, a tailors' press-board holder, constructed and arranged, and being of the portable character, as herein particularly described and operating as set forth.

36,685.—T. C. Brecht, of United States Army, and S. B. Sigesmond, of Washington, D. C., assignors to themselves and John Kuliuski, of Washington, D. C., and J. H. Housewright, of New York City, for Improvement in Combined Cloak, Tent, Bed, &c.:

We claim, first, A portable tent, made of a double water and air-tight fabric, in the manner and for the purposes substantially as specified.

Second, We claim the herein described arrangement for changing a cloak into a *tente d'abri*, hammock, ambulance and life-preserver.

Third, We claim a combined cloak, tent, hammock, ambulance and life-preserver, constructed substantially as herein described.

36,686.—M. L. Callender (assignor through mesne assignments to C. H. Welling) of New York City, for Improvement in Compound Explosive Projectiles:

I claim a projectile, having a steel bar or center inserted on a line with its axis, when said bar contains an independent explodingmagazine.

Second, I claim the combination in a projectile of a discharging chamber and penetrating bar of steel, or similar metal having an exploding magazine within it, and supplied with a percussion and fuse apparatus, for the purpose and in the manner as set forth.

36,687.—W. D. Grimshaw, of Newark, N. J., assignor to himself and C. A. Ten Eyck, of New York City, for a Washing Machine:

I claim the arrangement of the pairs of washing machine rollers, c

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c, and squeezing rollers, f f, in the manner specified, so that the power to revolve said rollers is applied to the two middle rollers while the upper and lower rollers are yielding, for the purposes set forth.

36,688.—H. B. Morrison, of Mount Morris, N. Y., assignor to C. H. Morrison, of Le Roy, N. Y., for Improvement in Nozzles for Hose and Pipes:

I claim, first, The revolving or adjustable tips, J K, applied to A F, of hose or water pipes, as and for the purpose set forth.

Second, The arrangement of the nuts, B E, thimble, C, sleeve, D, when used in combination with the nozzles, A F, and sleeve, G, to operate as and for the purpose herein described.

[The object of this invention is to obtain a nozzle for hose and water discharge pipes, which will be capable of directing the stream of water in various directions, and also capable of discharging either one or two streams as may be desired.]

36,689.—G. H. Smith (assignor to S. O. Smith), of Rochester, N. Y., for Improvement in Illumination:

First, I claim the use of common atmospheric air, in the place of oxygen gas in the combustion of illuminating gas or its equivalent, for the production of a high degree of heat, when such atmospheric air has been previously heated, and in that condition, is forced by means of properly arranged jets, into intimate contact with the illuminating gas at the moment of combustion, substantially in the manner herein above set forth.

Second, The use of common atmospheric air, in the place of oxygen gas in the combustion of illuminating gas or its equivalent, for the production of an intense degree of light, when such atmospheric air has been previously heated, and in that condition, is forced by properly arranged jets, into intimate contact with the illuminating gas, at or before the moment of combustion, both being at the same time made to impfnge upon a suitable piece of lime or other known equivalent, substantially in the manner above described.

Third, The use of common atmospheric air, in the combustion of illuminating substances, such as illuminating gas, oils or hydrocarbons or their equivalents, for the production of an increased degree of light, when such atmospheric air has been previously heated, and in that condition. is brought in intimate contact with any of said illuminating substances, at or before the moment of combustion.

36,690.—James Ward (assignor to himself and I. F. Hunnewell), of Boston, Mass., for Improvement in Brick Machines:

I claim the arrangement of the pulverizing and pressing rollers, I I, in combination with the revolving series of molds; when geared and operated conjoiatly in the manner and for the purpose specified.

36,691.—J. S. Hall, of Pittsburg, Pa., for Improvement in Machine for Forging, Bending and Shaping Plowshares:

I claim, first, The die, B, for drawing down, beveling and shouldering the blank, substantially as and for the purpose herein described.

I also claim in combination, the dies, C D, for griping, bending and forming the plowshare, when constructed and operating substantially as herein described.

36,692.—Suspended.

36,693.—D. B. Chapman (assignor to himself and E. D. Draper), of Milford, Mass., for Improvement in the Manufacture of Soap:

I claim the combination of a carbonate or caustic soda, with an alkaline silicate and vegetable flour, combined with soap or a saponified oil or fat, substantially as described.

RE-ISSUE.

1,346.—E. A. and W. Tuttle, and J. S. Bailey, of New York City, assignees of the administrators of C. F. Tuttle, deceased, for Improvement in Hot-Air Registers. Patented January 23, 1849:

We claim the application of the upright or vertical wheel, G, or part or segment of a wheel to the opening and closing of hot-air registers or ventilators; the edge or periphery of which wheel is so placed as to adapt it to be operated on by the foot if desired, substantially as set forth.

[The nature of this invention consists in the new and improved method adopted in opening and closing the register or ventilator by means of an upright vertical wheel, or a segment of a wheel which is connected with and gives motion to the valves.]

DESIGN.

1,663.—Matthew Townsend, of Chelsea, Mass., for a Design for the Border of Shawls, &c.

NOTE:—In the above list of claims we recognize the names of TWENTY-ONE patentees whose papers were prepared at the Scientific American Patent Agency.—EDS.

INVENTIONS EXAMINED at the Patent Office and advice given as to the patentability of inventions, before the expense of an application is incurred. This service is carefully performed by the Editors of this journal, through their Branch Office at Washington, for the small fee of $5. A sketch and description of the invention only are wanted to enable them to make the examination. Address MUNN & COMPANY, No. 37 Park-row, New York.

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On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
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The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

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The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

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Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

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G. W. B., of Conn.—Toilet soap is made by boiling lard for a long period in caustic soda. It is scented with any of the essential oils. Lard does not make such a hard soap as suet; 9 parts of white mutton suet and 1 of olive oil boiled in caustic soda makes a beautiful toilet soap. Transparent soap is produced by dissolving common hard soap in alcohol, then drying it. Much of the toilet soap used is made by scenting common hard soap with the essential oils of lavender, bergamotte and rosemary.

G. M. D., of Mich.—In 1859 a series of experiments were made upon a railway in England, by Wm. Fairbairn, F. R. S., to test the retarding force of two continuous self-acting brakes. From three experiments with Newall's brake, speed from 50 to 51½ miles per hour, the retarding force was equivalent to 440·3 pounds per tun weight of the train. From three similar experiments with Fay's brake, the retarding force was 403·6 pounds per tun. The power required for brakes operating to stop cars going at a certain velocity depends almost entirely upon the space in which the train has to be stopped. With these two brakes exerting the retarding power a train running at the rate of 20 miles per hour could be stopped in a space of 23·4 yards; at a speed of 30 miles per hour in 52·9 yards; at 40 miles per hour in a space of 93·8 yards. Mr. Fairbairn read a long paper detailing an account of the experiments before the Association for the Advancement of Science in 1859.

C. F. P., of Md.—Your perpetual motion, like all similar devices, is based on an erroneous principle. If you draw a sketch of it in its most unfavorable position, you will see the truth of our statement at once, but if you cannot convince yourself by a drawing, you can very easily make a small model. Your cartridge appears to be novel, and we think a patent may be obtained for it.

J. B. C., of Ill.—A beautiful varnish for workboxes, straw, &c., may be made with gum sandarach, 6 ounces; gum elima, 4 ounces; gum animi, 1 ounce; camphor, ½ ounce, dissolved in a quart of rectified alcohol. All spirit varnishes are liable to crack. Gum arabic dissolved in water is sometimes applied to straw to give it a gloss, but it is soluble in water and is therefore easily washed off.

A. F. O., of N. Y.—We suppose astronomers are generally satisfied with the art of "graduation" as it is. We are aware that the division of circular arcs into degrees, minutes, &c., requires the application of great practical skill. In Brewster's "Encyclopedia," the article on "Graduation" contains a very full account of the method of dividing astronomical and other instruments.

A. S. R., of N. H.—Common resin may be dissolved in boiling linseed oil, and when thinned with turpentine it makes a good common varnish, but liable to be sticky. Most resins will dissolve in turpentine and alcohol, and will thus make varnishes also; but all varnishes made with alcohol are liable to crack, and those produced with turpentine remain "tacky" for a long period after they are put on. A strawberry-colored stain may be made for white beech wood with a very strong decoction of Brazil wood and a little alum. If you wish to obtain a clear stain, mix the color with lac varnish; but if the stain is required to be dull, mix a little gum arabic with the red decoction.

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Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from October 15, to Wednesday, October 22, 1862:—

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A pamphlet of information concerning the proper course to be pursued in obtaining Patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office, or either of the Branches. They also furnish a Circular of information about Foreign Patents.

The annexed letters from former Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

MESSRS. MUNN & CO.:—I take pleasure in stating that while I held the office of Commissioner of Patents MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly, CHAS MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster General of the United States, he addressed to us the subjoined very grateful testimonial:—

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Your obedient servant, J. HOLT.

MESSRS. MUNN & CO.—*Gentlemen:* It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your Agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, WM. D. BISHOP.
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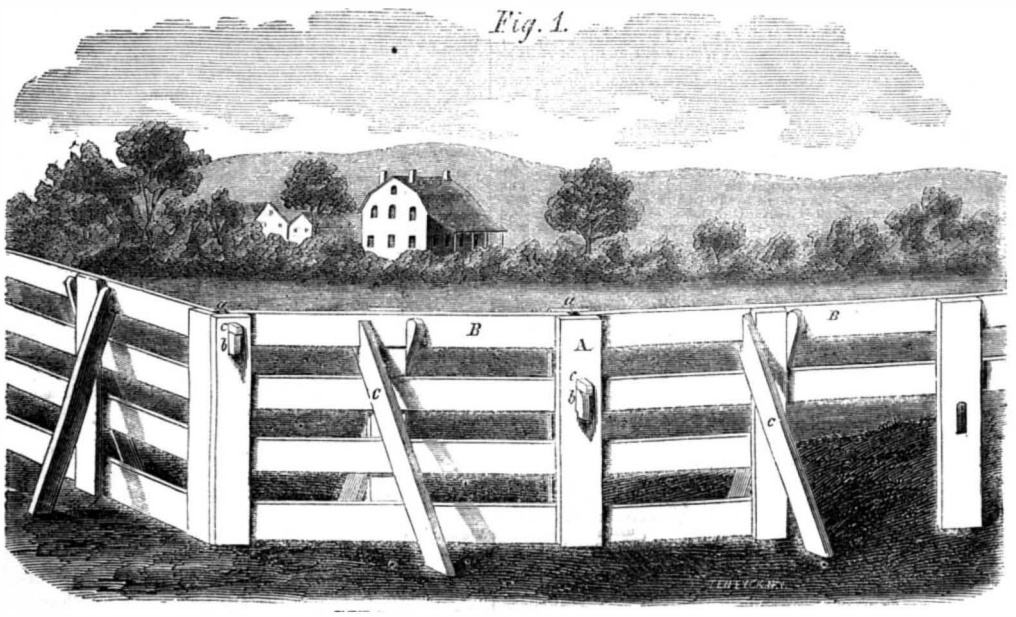
Improved Farm Fence

The accompanying engraving is a representation of an exceedingly neat and tasty fence for inclosing land of whatsoever kind, and one well adapted to new countries and rolling ground. The settler on the distant prairies or the emigrant breaking ground for the first time in the far West, remote from cities, finds here an invention which, by the exercise of a moderate degree of skill, enables him to mark the confines of his possessions with a fence which is cheaply constructed, easily removed from place to place, if desirable, and not liable to disarrangement It is elastic in its nature and readily adapts itself to inequalities of the ground, being without posts or post-holes; the diagonal braces supplying their places; and, lastly, it has not, necessarily, a nail employed in its construction.

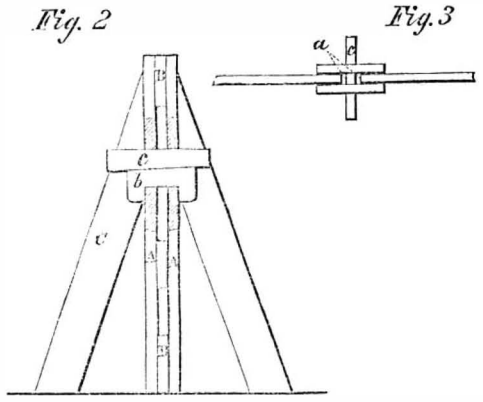
Fig. 1.



GIBSON'S PATENT FARM FENCE.

The arrangement of the parts is very simple, the upright, A, the longitudinal rails, B, the diagonal braces, C, and the gibs and keys, *b* and *c*, constituting the whole of one section. The invention consists in so arranging the upright, A, on the longitudinal rails, B, that the former may lap over the ends of the rails laterally, to which they are secured by the aid of the gib, *b*, and the key, *c*; the ends of the rails, however, are not permitted to butt together, but have a space, *a*, left between them of about two inches and a-half on each side, by which means the flexibility—one of the chief peculiarities of the invention—is secured.

Fig. 2 Fig. 3



The braces or stays, C, are attached to each side of the fence, and are provided with slots in their upper ends, which fit into recesses cut for them in the top rail or longitudinal bar; on the edges of the same braces notches are also cut, which fit into the same device cut in the upper side of the second rail from the top; thus the braces are retained in position without nails, while, at the same time, they bind the whole fabric rigidly together. The jaws of the gib, *b*, fit over the upright, A, as in Fig. 2, and they, as well as the keys, are allowed a little side play in the mortise, so that they may not cramp the fence while following the nature of the ground. At the corners of the fence the arrangement is the same in relation to the rails, with the exception that the gib, *b*, instead of passing through both uprights, is firmly secured to the upright, A, and passes through a mortise in A*, retained by a suitable key; the space is also allowed between the ends as in the other parts. When it is desired to make an angular or worm fence, the mortises pass through obliquely, by which method the required freedom is given to the various sections.

The patent for this invention was obtained through the Scientific American Patent Agency, and is dated May 13, 1862. By addressing William Gibson, box 363, Fort Wayne, Ind., further information can be procured.

DO NOT DESPISE THE SHOP.

The importance of mechanical training, and of habits of regularity and method, cannot be overestimated in their various bearings upon the relations of life, and we would say to those young men who are at this moment struggling through details which appear to be hard, useless and full of weariness, to hold on! their utility may not be apparent at present, but the day is sure to come when they will reap the benefit of such discipline and routine. Hold on! don't give up; in our country no social prejudices prevail which prevent the humble dyer from becoming the learned and skillful chemist; no barriers exist which deprive those whom the chances of life have made rude and unlettered, from becoming shining lights in the world of science. Most great inventors have sprung from the ranks of the brave daily workers, and the field is still a wide one, expanding every day; therefore we say "hold on" to the training of the shop, improve your spare hours in mental culture, and reward is certain.

What to Send to Soldiers.

Those who are in doubt what they should send to their friends in the army will do well to read over the following catalogue of items made up for general circulation by a Western journal:—

Ambrotypes in five-pound cases; "Life of Josephus," in ten volumes; patent Dutch ovens, full size; feather beds and pillows; ripe watermelons; firkins of fresh butter; sample from last litter of pups; baby wagons for use of infantry; sausage stuffers; castor oil in bladders; frosted cakes in bandboxes; catnip tea well stirred; fluid lamps without wicks; hair brushes; fiddle strings in the original package; vases for flowers; ice-cream freezers; rattlebelly pop in quart bottles; pillow cases stuffed with head cheese; flesh brushes with directions for use; fresh eggs; sand to scour knives with; pickles in jars; honey in little baskets; photographs in frames; bootjacks; French mode of raising trout; tea in caddies; hot water for soaking feet; nutmeg graters with handles; maps of the country on rollers; fanning mills for fevers; tomato catsup in casks; boot blacking in pint bottles; parlor skates; Suffolk pigs for pets; empty dry goods boxes; lead pipe for bullets; prepared kindling wood in bundles; flower seeds labeled; old horse collars; mush and milk in pans; mouse traps; cinnamon essence for the hair; clothes lines and pins; chicken gravy in bowls.

All such articles the soldiers can as well carry as not, and if captured the enemy will wonder at the inexhaustible resources of the North.

Some curious experiments in gunnery have just taken place in Verona. Fort Wratislaw, belonging to Austria, was cannonaded first at a distance of six hundred paces, and then of one thousand, the guns being charged with gun cotton. The impulsive force of this substance was ascertained to be two and one quarter times that of gunpowder.

A fire-proof building is to be erected at one of the docks in Liverpool, for the exclusive purpose of storing the petroleum that arrives from America. It is to be furnished with iron tanks capable of holding 320,500 gallons, and with room above the tanks for storing 140,000 in casks.

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FROM THE STEAM PRESS OF JOHN A GRAY

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